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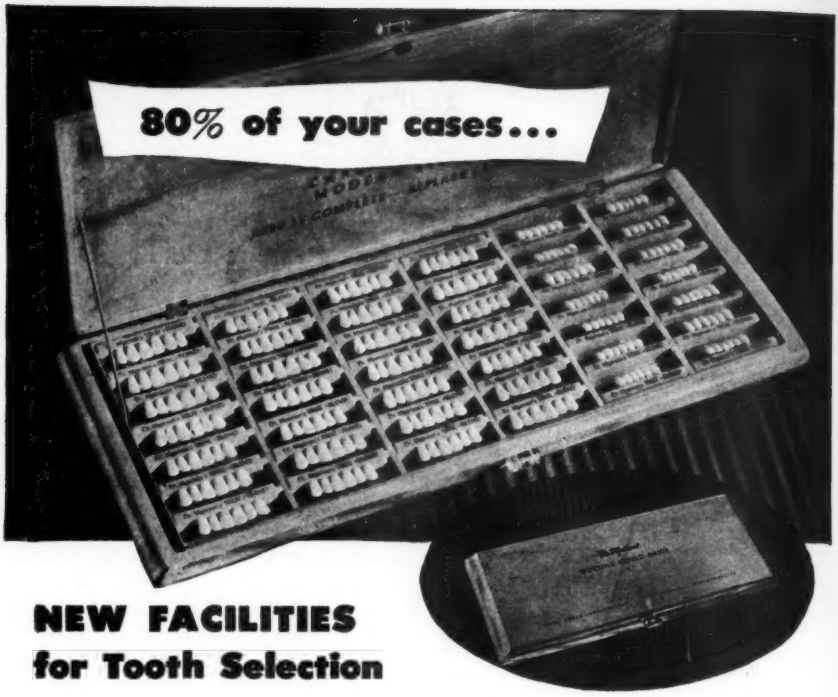

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THE Journal OF THE
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TECHNICS AND MATERIALS FOR THE MANAGEMENT OF GINGIVAL CAVITIES

Carl R. Oman,* D.D.S., New York

THE management of gingival cavities deserves extensive study and requires the development of a high degree of skill in operative procedure.

The incidence of dental caries in the cervical area appears to be increasing and a large part of our work in operative dentistry is concerned with the restoration of lost tooth structure in this region. Erosion and abrasion add to the indications for operative interference. The cause of gingival erosion is not fully understood. Bodecker[1] and Miller[2] believe that it arises from the secretion of an acid under the gingival margin which is released periodically and results in the etching of the tooth structure. Abrasion may be the consequence of incorrect toothbrushing habits, resulting in a ditch or groove in the gingival area which develops rapidly as soon as the enamel has been worn through and the dentin exposed. Caries does not usually accompany abrasion, because the same factor which causes the condition keeps the area clean. The damage resulting from loss of tooth contour and the consequent injury to the gingival tissue require the restoration of the tooth to normal contour.

In addition to the factors of erosion and abrasion there are other causes for the loss of tooth structure. These include caries, caused by an unclean condition of the gingival surface, the accumulation of débris on the tooth surfaces because of infrequent and inefficient brushing and the pernicious habit of holding gum and candy in contact with the gingival area. The resultant caries may extend over a rather large area in the gingival third of the tooth. Decalcification or pre-carious lesions indicate the need for filling, and the extent of the decalcification predetermines the outline of the cavity and the subsequent filling.

Read at the Midwinter Meeting of the Chicago Dental Society, February 1946.

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1. Bodecker, C. F., Dental Erosion: Its Possible Causes and Treatment. *D. Cosmos* 75:1056, 1933.

2. Miller, W. D., Experiments and Observations on the Wasting of Tooth Tissue Variously Described as Erosion, Abrasion, Chemical Abrasion, Denudation. *D. Cosmos* 49:1 (January) 1907.

Properties of Filling Materials

The properties most desirable in materials for permanent operations have been listed by Black[3] as: (1) indestructibility in the fluids of the mouth, (2) adaptability to the walls of cavities, (3) freedom from shrinkage and expansion after having been placed in tooth cavities, (4) resistance to attrition and (5) sustaining power against the forces of mastication.

Those qualities of secondary importance include: (1) color and appearance, (2) nonconductivity of thermal impressions and (3) convenience of manipulation.

Evaluation of Filling Materials

The materials available for the filling of Class 5 cavities are gold foil, amalgam, gold, porcelain, acrylic resin and synthetic porcelain. A critical evaluation of the physical properties of the various filling materials, based upon what we know to be qualities most necessary or desirable, must convince us that gold foil is the filling material of choice. It is generally conceded that no other material, with the possible exception of amalgam, can even approach gold foil in serviceability. Certainly no other filling material possesses the primary attributes to so great a degree. The secondary qualities of gold foil are not so good, for the color of the material is in too great contrast to tooth structure. It has a high degree of conductivity and is not too amenable to manipulation. When one has taken the time and trouble to become expert in its use and to employ it judiciously or in combination with other materials with better secondary qualities, a lasting and esthetic restoration can be made.

Amalgam

Amalgam must occupy second place in the choice of a filling material for this area when the primary qualities are being considered. It has the further advantage of ease of manipulation and can be managed in places where gold foil cannot be used because of lack of convenient access or because of the difficulty of maintaining a dry field for the length of time necessary to condense gold foil properly. Amalgam can be well contoured and finished and is not subject to flow or stress in the gingival area. From the esthetic standpoint, amalgam is greatly inferior to gold foil, even when highly polished, for it soon discolors as the result of oxidation.

Gold Inlay

The gold inlay is used in this area with some success by some operators. However, the inlay has all the disadvantages of gold foil from an esthetic point of view and it is virtually impossible to produce continuity of surface when finishing the gingival margin. The cement margin is always present and causes gingival irritation. In the larger operations in this area, the gold inlay has its place because of the ease of manipulation and the saving of time in malleting. However, one should always cast these restorations in 24 carat gold in order more easily to accomplish a hand finish at the gingival margin. I know men of great ability who, in an effort to make fillings less irritating to the tissues in the gingival area, have made amalgam dies into which they mallet gold foil. The filling is finished on the die which is then cracked apart to recover the filling. This restoration, which is now cemented into the cavity, is an improvement on the cast inlay but not as good a restoration as can be made by malleting the foil directly into the cavity and properly finishing it against the cavity walls.

Porcelain Inlay

The porcelain inlay has great merit and possesses the secondary requisites of a filling material to a very high degree. A properly made and properly contoured

3. Black, G. V., *Operative Dentistry*. Chicago: Medico-Dental Publishing Co., 1908, vol. 2, p. 224.

porcelain inlay of the correct color is a thing of striking beauty. However, here again we are dependent upon cement for retention and with the washing out of the cement at the gingival margin we have a source of irritation to the gingival tissues. The difficulty of manipulation is another factor to consider. Porcelain is not easy to manipulate and a longer time is necessary to process it properly. This increases the cost to a point where it is almost prohibitive except for our wealthier patients.

The Acrylic Resins

With the advent of the acrylic resins and their application to dental uses, many dentists felt that here might well be the answer to many of the problems which confronted them, especially in those locations in the mouth where esthetics is of prime importance. This material is easy to manipulate, is nonconductive of thermal impressions, has wonderful esthetic possibilities, is readily obtainable and is highly resistant to wear. But in individual restorations where stress must be borne, it is practically useless, because the resilience of the material causes the cementing substance to separate from the material, resulting in the early loss of the inlay. In Class 5 restorations the acrylic inlay threatens to replace the porcelain inlay because of its admittedly fine esthetic properties; also it is not of itself irritating to soft tissues and is not soluble in the fluids of the mouth. However, it is necessary that it be retained by cementation, a weakness which is inherent in all inlays, regardless of material.

Synthetic Porcelain

Another material which is widely used in the restoration of the cervical area is the synthetic porcelain filling. It is a cement filling and can never be considered anything but a temporary restoration. The color of the tooth can be perfectly matched and the secondary qualities are met more fully than with any other material. Unfortunately, it possesses none of the primary qualities for which we are seeking and we dismiss it, therefore, as a temporary material of rather high cosmetic value.

Cavity Outline

The outline of marginal gingival cavities (Fig. 1) is determined by the extent of the caries or erosion and by the penetration or extension of the lines of chalky enamel, the forerunner of decay in this area. Nature gives us the indication for extension. A superficial study alone gives us the clue to the amount of extension required. Where these clues are followed and the cavity is carried out to include the areas of decalcification, we obtain extension for prevention exactly where it is necessary with a minimum of cutting.[4] The mesial and distal margins are placed within the corresponding angles of the tooth except where chalky lines persist for a greater distance. If these lines pass beyond the angles of the tooth, the outline should be carried into the embrasure, where it is intersected by already-existing proximal restorations or where future proximal restorations may be made. The gingival margins of all such restorations must of course be placed below the gin-

4. Hollenback, G. M., Personal communication.

Fig. 1.—Types of cavity outline. Left to right: gold inlay, amalgam, gold foil with distal extension and simple gold foil

gival margin, often in the cementum. Extension in an incisal or occlusal direction is determined by the extent of decalcification or erosion, usually at the junction of the gingival and middle thirds of the labial or buccal surface. If an extension of decalcification occurs on the distal surface, the outline may be carried incisally or occlusally without regard for symmetry of form since the outline will fall in an area which is beyond the height of contour and therefore not ordinarily visible. Generally, however, the incisal margin is made in a line parallel to the lip line or occlusal plane, the thought being that when the patient raises his lip, as in smiling, the entire margin is exposed at once; whereas disclosing a part of the margin or an extension of the outline gives the appearance of asymmetry. In anterior teeth it is best to keep the entire preparation as high cervically as possible in an attempt to hide all of the restoration.

The Dentinal Tubules

Not to be overlooked is an important biologic consideration which influences cavity outline in this region. Histologically, the tooth is so constituted that the dentinal tubules run toward the pulp in a downward sloping S curve. These tubules carry fluid from the pulp to the dentin and are responsible for the normal appearance of the tooth structure. It is well, therefore, merely to make a definite angle for resistance and to avoid excessively undercutting the occlusal or incisal wall. The minimum number of tubules are thus cut off from connection with the pulp. A straight occlusal or incisal margin naturally results in a smaller number of tubules being severed, as contrasted with the longer curved wall which is produced when the kidney-shaped outline is used. In this latter situation we often observe that the tooth structure between the two horns or projections of the cavity has a bluish or discolored appearance which may indicate a drying out and brittleness of the isolated underlying dentin and enamel. The enamel in this area is also subject to injury in malleting, and, having no method of repair, may later break down, resulting in secondary decay and a failure of the operation.

The preparation of a cavity on the cervical area is effected with ease when the proper technic is employed. In the case of gold foil operations, the use of the rubber dam is mandatory since the field of operation must be kept absolutely dry. Although application of the rubber dam to a single tooth may be sufficient, it is much better to include at least one tooth on either side of the prepared tooth, making it possible to apply compound under the bows of the clamp which is used to retract the gingiva. This application of modelling compound, in addition to keeping the clamp in position and preventing its movement in either a gingival or incisal direction, stabilizes the tooth and reduces the shock of operative procedure. One can mallet as hard as is necessary to produce a watertight filling.

Cavity Instrumentation for Gold Foil

With a 33½ or 34 inverted cone bur in the straight handpiece, the gingival floor is established with one sweep of the instrument, cutting into the tooth structure with the side of the bur, the floor itself being flat since the end of the bur does the cutting there (Fig. 2). The contour or outline of the cemento-enamel junction can be followed as this cut is made. It is not necessary to cut in an axial direction beyond entrance into the dentin, for this type of cavity should be kept as shallow as possible. The mesial and distal walls are established with the bur, the bur being inclined so that its end forms the walls which will meet the axial wall at an obtuse angle, much as an inlay wall would be inclined. The incisal or occlusal wall is formed by a single cut with a No. 6-2-6 hoe in the smaller cavities or with a No. 39 Wedelstaedt chisel in a bicuspid or molar tooth. The same instrument may be used for planing the

axial wall, during which manipulation the caries is also removed by the simple expedient of scraping this wall to its proper depth. Should the caries extend deeply into the dentin, a cement base may be necessary. The retentive angles are made next and are accomplished with the anterior angle formers or with the No. 6-2-6 hoe. These angles are undercut and are placed in the gingival portion of the cavity at the junction of the axial and gingival walls at the points where these walls meet the mesial and distal walls. The mesial and distal walls should never be undercut in preparing a Class 5 cavity for gold foil. Such undercutting weakens those walls to a point where they may fracture in the course of malleting. The angle formed by the junction of the incisal and axial walls need not be undercut for reasons stated above. A right angle or slightly obtuse angle is all that is necessary here. The gingival cavosurface angle is now slightly bevelled to protect the short enamel rods properly and the remaining walls are planed smooth and extended where necessary so that no decalcified enamel remains on the cavosurface. The cavity is now ready to be filled.

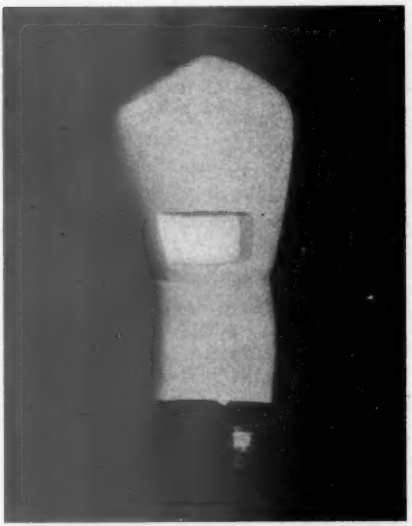

Fig. 2. — Basic type of cavity prepared for combination noncohesive and cohesive gold foil

Malleting Procedure for Cohesive Foil

The gold is built up in any manner in which one may be accustomed to working the material. If cohesive gold is used to build the entire filling it is necessary to maintain the proper line of force in malleting so that full advantage may be taken of the welding property of the foil. Too much variation in this regard will result in burnishing the foil with consequent loss of cohesion. It is best to begin the filling in one of the gingival angles, probably that angle which is farthest away from the point of entry into the cavity. The first piece of gold is driven directly into the angle in such a way as to bisect the angle with the direction of force. Subsequent pieces of gold are added so as to extend the filling evenly on either side of the angle, thus forming a triangular bar of gold. This bar is continued until the margin is covered at the point where it is intersected. From this point the gold may be carried along the mesial or distal wall, depending on where one has made one's start, until the incisal wall is reached. Returning now to the starting angle, one continues to build the gold along the gingival wall, being careful to allow it to spread out over the cavosurface angle. As soon as a cushion of gold exists sufficient to protect the enamel from the force of the blows, it is malleted down. When the opposite gingival retentive angle is reached, some of the uncondensed gold is carefully tamped into the angle. When sufficient material is in position, it is malleted to place. The remainder of the mass must be held securely during malleting. One continues to build the foil until the remaining wall is covered and the mass extends into the angle formed by the junction of the axial wall and the incisal wall, building the gold up and over the margin.

When all the margins are covered by gold, which is anchored in the body of the mass, the contour is built by adding gold to the center of the depression that remains in the body of the filling. The condenser is carried in parallel rows from the point of attachment up to and over the margins. This results in stretching or squeezing the gold against the margin and will produce a watertight filling (Fig. 3).

Combination Noncohesive and Cohesive Filling

Should the operator care to shorten the time for condensing the filling, or if the cavity is so large as to make it laborious to fill completely with cohesive foil, he may avail himself of a technic which employs the use of noncohesive foil in combination with the cohesive or annealed foil. One such method is to make a pillow of noncohesive foil. A piece of noncohesive foil, one-fourth size sheet of No. 4 foil, is cut and folded over on itself six times, resulting in 64 thicknesses of foil.[4] This is burnished into the cavity with a pledget of cotton much as one would burnish a matrix for the construction of a porcelain inlay. The cotton pledget is removed and a fairly large piece of annealed foil (about one-thirty-second of a sheet of No. 4 foil) is malleted to place in the center of the mass

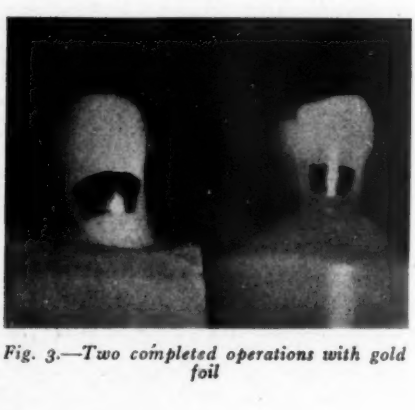

Fig. 3.—Two completed operations with gold foil

Fig. 4.—Procedure in filling. The cavity walls are lined with noncohesive foil and cohesive foil is malleted into the center of the cavity

of noncohesive foil. The foil is worked toward and over the margins in the same manner as was done in building contour with cohesive foil (Fig. 4). The cohesive foil cuts the softer foil off at the margins and produces an excellent filling in a very short time.

Another method of using noncohesive foil in combination with cohesive foil is the method developed and taught by W. I. Ferrier.[5] Under this method the walls of the cavity are first lined with noncohesive foil. Successive pieces of cohesive foil are then introduced and malleted to place, the previously placed gold being wedged against the cavity walls, until the noncohesive foil is covered with the cohesive gold.

Finishing the Filling

Finishing these operations calls for meticulous care and is done while the clamp is still in place in order properly to pro-

5. Ferrier, W. I., Clinical Observation on Areas of Erosion and Their Restoration. *J.A.D.A.* 20:1150 (July) 1933.

tect the gingival tissues. All margins are finished to form with hand instruments, either a spoon excavator or a straight chisel, cutting from tooth structure to margin in order to obviate the possibility of producing a ditch at the margin and in order better to follow the contour of the tooth. Working in a dry field, produced with the rubber dam in place, the operator can easily see when the excess has been removed at the margins. The surface of the metal is carefully disked with a well-lubricated disk, not larger than one-half inch in diameter, care being taken not to cut below the gingival margin into the cementum. When the gross scratches are removed, successively finer grits are used until the surface is smooth. The final finish may be accomplished by the use of dry fine pumice on a rubber cup, followed by dry whiting or tin oxide to produce a mirror finish.

Care must be observed in removing the clamp to prevent scratching of the surface. The rubber dam is removed and the tissues are gently massaged to restore circulation. If proper operative procedure has been followed, this operation will have been accomplished with no damage to the soft tissue and the tooth will have been restored to normal form and function. The end result will be quite different from the situation that exists when other methods of restoration are employed. Future observation will disclose that in a surprising number of cases the tissue completely covers the restoration.

Although gold foil must always be the standard, when considering the perfect filling material, it is obvious that it cannot always be used. However, we can do no better than to employ the same care in our other operations as that demanded in the use of gold foil. A greater use of the rubber dam would result in a startling improvement in the quality of our dental operations, whatever their nature. The use of the cervical clamp to expose the gingival margin and keep it accessible is an invaluable aid. Even in the construction of an inlay it would be better to use the dam. The cavity preparation would be vastly improved, and I sometimes wonder if many of our inlays would be cemented to place if the dentist could observe their fit under the rubber dam. Many amalgam restorations fail because of moisture being incorporated with the mix; and without the rubber dam it is impossible to use both hands for manipulation of the material.

Other Filling Materials and Technics

When moisture cannot possibly be excluded from the cavity because of inability to use the rubber dam, copper amalgam is resorted to since it can be worked in a moist field without its properties being affected too greatly (Fig. 5). It is also bacteriostatic in its action and dissolves more slowly than a cement filling.

Where a cavity extends for a great distance around the circumference of the tooth, an amalgam filling can sometimes be placed in sections (Fig. 6). A portion of the cavity can be filled with cement to supply one of the missing walls and to reduce the extent of the cavity mesially or distally. The amalgam is then packed against the four walls which are in the same plane. At a subsequent sitting the cement can be cut away and the remainder of the cavity filled with amalgam. When trimmed and polished, the filling is virtually the same as a single filling.

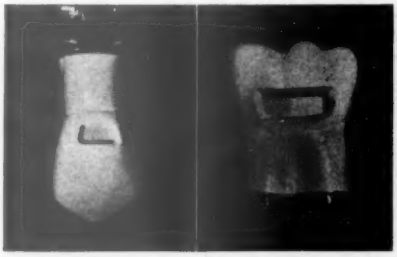

Fig. 5.—Cavities prepared for amalgam. Left: in upper bicuspid. Right: in lower molar

Fig. 6.—First stage of amalgam being placed in sections

Occasionally it is very difficult to fill a cavity with amalgam because of its location, that is, in the disto-bucco-gingival surfaces of upper molars. In such cases it is sometimes expedient to prepare an inlay cavity (Fig. 7), take an impression in compound and pack an amalgam die, after which an inlay is waxed and cast to fit the die. The inlay is completely finished against the die and set as one would set an inlay made directly.

Silicate fillings, temporary though they are, require an exacting technic. For proper handling, use of the rubber dam, the cervical clamp and the prepared matrix is always necessary for success.

The porcelain inlay calls for a highly refined technic which must be meticulously followed and which is not generally suitable for gingival cavities.

The acrylic inlay, constructed according to the best accepted methods, in copper plated die or Kryptex die, is being used a great deal in modern practice (Fig. 8). In most respects it is a very satisfactory restoration but too often the inlay is lost soon after cementation, owing to failure of the cement or expansion of the inlay.

Cementation and Impression Technics

I should like to suggest what I believe to be an improved method of cementation. The inlay is cemented in the usual manner with the rubber dam and gingival clamp in position. As soon as the cement is sufficiently hard, a trench is cut in the gingival surface exposing the gingival margin of the tooth but leaving a projection of the inlay in the axial portion of the cavity. Cohesive gold foil is malleted into the resulting box, after undercuts have been made with a No. 33½ inverted cone bur in both the tooth structure and the acrylic inlay. The action of the foil is to wedge the inlay more tightly against the cavity walls and to act as a lock for the entire restoration. The gingival margin is thus perfectly sealed (Fig. 9) and can be finished in

Fig. 7.—Prepared inlay cavity and impression

perfect continuity with the tooth surface; and that portion of the restoration which is visible is made of a material which has satisfactory esthetic qualities.

Following is a method for obtaining a satisfactory impression for either direct or indirect inlays in the cervical region. A tray, cut from a section of a copper band, is shaped. A small piece of inlay wax is softened, pointed and attached to this metal tray. The tip of the wax is introduced into the cavity and pressure is applied in the usual way. The end of a compound stick (Kerr's red compound is preferred because of its rigidity) is softened in the flame and applied over the metal surface which carries the wax, heavy pressure being exerted in an axial direction. The heat of the compound softens the wax and the pressure applied to the compound drives the newly softened wax into the angles of the cavity, resulting in an excellent impression, not only of the cavity but of a large portion of the tooth surface. A die may then be made in any favorite material and the restoration is completed in the usual way. Should one desire to employ this method for correcting a direct impression, it is an easy matter to strip off the metal matrix while holding the impression in the tooth, carve down the excess with the wax carvers of choice, place a sprue in the impression, remove and cast, or process, if the restoration is to be an acrylic inlay.

Fig. 8.—Acrylic inlay in an upper central incisor with preparation for gold foil at the gingival margin

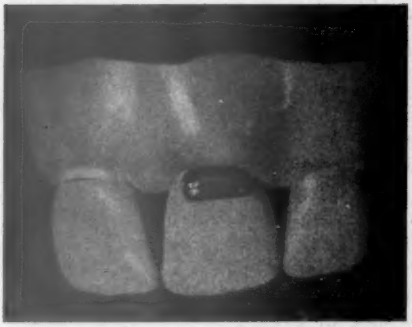

Fig. 9. — Acrylic model of an upper central incisor, showing acrylic inlay locked to position with gold foil at the gingival margin

Dietrich's elastic impression compound is an excellent material which can be used with the foregoing method. Positive pressure and confinement of the material is assured during the cooling of the material. One advantage of an elastic impression material of this type is that it is possible to reproduce slight undercuts in the impression which have been purposely placed in the cavity and which will be reproduced in the resulting acrylic inlay. Because of the resiliency of the material, such an inlay can be forced into the cavity, resulting in better retention.

Summary

1. Cervical erosion, abrasion and gingival caries combine to supply the dentist with a large portion of his operative work.

2. The properties of the various filling materials available must be carefully

considered in order to give the patient the best service and to produce lasting restorations.

3. A comparison of the filling materials reveals that gold foil is superior to all others for restorations in the gingival area because it is tolerated by the soft tissue and can be finished in perfect continuity with tooth structure.

4. Cavity outline is influenced by the extent of dental caries but if other clues are noticed and followed, the typical outline of a Class 5 cavity will assume the shape of an irregular trapezoid with the occlusal or incisal margin in a plane parallel with the lip line or the occlusal plane.

5. The management of these cavities by the routine use of gold foil is not a difficult procedure. The cavity preparation is very simple and the manipulation of the foil is not a hardship for either patient or dentist.

6. Gold foil should be accepted as the standard filling material for this particular operation. In the use of other materials, it is best to follow gold foil technic, including the general form of cavity outline.

7. The use of the rubber dam and the cervical clamp will result in better operations regardless of the material used.

8. Knowledge of different materials and their use may prove helpful.

9. Probably the ideal restoration in these gingival cavities is gold foil in combination with a filling material of better secondary qualities which would achieve esthetics as well as restoration of form and function.—*630 West 168th Street.*

DENTAL ROENTGENOGRAPHY

II: VERTICAL ANGULATION, FILM PLACEMENT AND INCREASED OBJECT-FILM DISTANCE

Gordon M. Fitzgerald,* D.D.S., San Francisco

THE value of roentgenographic examinations in dental practice depends on the quality of the resulting roentgenograms and the accuracy of the interpretations. Ennis[1] said that it is not easy to interpret a perfect dental roentgenogram and that it is practically impossible to interpret an imperfect one. That being the case, it follows that if the shadow images are distorted and indistinct, various conditions or lesions may be suggested but not decisively revealed in the roentgenogram with the result that misinterpretations will prevail. Increasing interest in correct technical procedure demonstrates that the profession has come to realize as never before the need for roentgenograms of the best quality obtainable. Haphazard technical procedures will not result in roentgenograms of consistently good quality because the latitude of error is so limited. It is possible to place a film packet in the mouth, direct the roentgen rays in its general direction and produce a roentgenogram, but the probability that all the factors will conform

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1. Ennis, L. M.: *Dental Roentgenology.* Philadelphia: Lea & Febiger, 1939.

to the requisite conditions of correct procedure is extremely remote. Consistently good roentgenograms will be produced if, instead of using procedures at random, the operator will study and utilize the factors that control quality and at the same time will systematize and standardize the procedure.

The ideal dental roentgenogram displays a maximum of anatomic accuracy in both the shape and size of the resulting roentgenographic image, the highest obtainable degree of definition of all the dental structures and tissues present and the proper balance of roentgenographic contrast and density so that maximum visibility of detail is assured.[2] In other words, a dental roentgenogram should be correct anatomically, roentgenographically and photographically.[3] Probably the most important of the foregoing qualities in the ideal dental roentgenogram is anatomic accuracy. It is attained by the correct alinement of the film, the object and the x-ray tube. This alinement, which is referred to as film placement and angulation, involves the position of the film packet in the mouth and its relationship to the long axes of the teeth and to the projection of the central ray in vertical and horizontal planes.

Vertical Angulation

Angulation usually is separated into two types, according to the plane of projection. Vertical angulation is the projection of the roentgen rays in a vertical plane, either from above downward to-

2. Jerman, E. C., *Modern X-Ray Technic*. St. Paul and Minneapolis: The Bruce Publishing Co., 1928.

3. Thompson, W. S., *Operative and Interpretive Radiodontia*. Philadelphia: Lea & Febiger, 1936.

Fig. 1.—Upper molar region, lateral projection. The occlusal surfaces show in profile, and the zygoma shadow, which appears in the middle of the upper edge, is diminished in size

ward the region to be examined or from below upward. In the first instance, it is referred to as *plus* vertical angulation and in the second as *minus* vertical. Horizontal angulation is sometimes referred to as directional angulation and is the projection of the radiation in a horizontal plane around the jaws of the patient. The placement and inclination of the film packet is intimately involved with both vertical and horizontal angulation. Of the two types of angulation, vertical angulation creates more obvious distortions than the horizontal type. These distortions affect anatomic accuracy and can be detected in the roentgenogram as foreshortening or elongation or changes in the shape of the shadow images. Since vertical angulation and its related film placement are primarily responsible for the degree of anatomic accuracy present in the roentgenogram, it will be given more consideration at this time. Horizontal angulation and its related film placement will be stressed in greater detail in subsequent articles that will describe the examination of each part of the mouth.

Lack of anatomic accuracy, sometimes known as shape distortion, does more to render the images in a roentgenogram unfit for interpretive purposes than any of the other features. Shape distortion can be defined as the changing of the resulting shadow images so that they no longer represent the true shape of the object undergoing roentgenographic examination. If the object itself is actually rectangular, it is a definite disadvantage interpretively to project its shadow so that the image on the film is square.[4] A distortion of this sort can be avoided and

4. Files, G. W. and others: *X-ray Studies III.* Chicago: General Electric X-ray Corp., 1935.

Fig. 2.—Upper molar region, mesial oblique projection. The open interdental spaces make it possible to view across the crest of the alveolus, thereby gaining a true impression of the resorption present. The characteristics of the alveolar bone are apparent

anatomic accuracy attained by the correct geometric relationship of the projected bundle of roentgen rays to the object and the film.

For example, in the upper first molar region, the dental roentgenograms that display the following features can be said to demonstrate a high degree of anatomic accuracy (Figs. 1-3): one that shows the crowns of the teeth in profile with little or no occlusal surface in evidence; one that shows the interdental spaces open so that it is possible to view across the crest of the alveolar ridge and not onto it; one in which the projected shadow images closely approximate the dimensions of the actual molars, with the elimination of the usual foreshortened buccal roots and elongated lingual roots, and one in which the obscuring shadow of the zygoma either is eliminated or so minimized in size that it can be shifted forward or backward or off the film by oblique horizontal angulation.

Film Placement

To achieve this degree of anatomic accuracy, it is important to consider the rules that govern the geometric principles that are involved in the film placement and the vertical angulation of the roentgen rays.

The first rule to follow is to determine the inclination of the long axes of the teeth to be examined, since subsequent steps in this technical procedure are based on this factor. Clinical examination of the coronal surfaces of the teeth and the labial and buccal reflexes enables the operator to ascertain the inclination. This is a simple matter which becomes even easier with increased experience. With this inclination as a guide, the film packet is positioned in the mouth so that its plane is parallel to the long axes of the teeth. The vertical angulation then is directed so that the central beam is at right angles to the two parallel planes. To complete the procedure, the central beam is maintained at the level of the apices of the teeth to be examined; the occlusal plane must be kept parallel to the floor.

Fig. 3.—Upper molar region, lateral projection. The buccal roots of the first molar are not foreshortened nor is the lingual root elongated. The floor of the maxillary sinus and the dental structures are not obscured by superimposed shadows

Figure 4 shows the plane of the film placed parallel to the long axis of the tooth, with the central beam, indicated by the arrow, projected at right angles to the two parallel planes. This procedure, which is not new, was advocated by Kells,[5] approached by LeMaster[6] and since 1911 has been used and perfected to a high degree by McCormack.[7] With dental roentgenograms taken in this manner, the relationship between caries and the dental pulp is indicated more accurately; the periodontist has a truer impression of the extent of alveolar resorption, and the exodontist, orthodontist and prosthodontist can determine the true characteristics of the alveolar structures and the actual root length of the teeth present. These features are illustrated in the inset in Figure 4.

5. Kells, C. E., *Three Score Years and Nine*. New Orleans: Published by author, 1926.

6. LeMaster, C. A., A Modification of Technique for Roentgenographing Upper Molars. A Speedy Technique for Roentgenographing the Teeth. *D. Cosmos* 66:433 (April) 1924.

7. McCormack, F. W., A Plea for a Standardized Technique for Oral Radiography, with an Illustrated Classification of Findings and Their Verified Interpretations. *J. D. Res.* 2:467 (September) 1920.

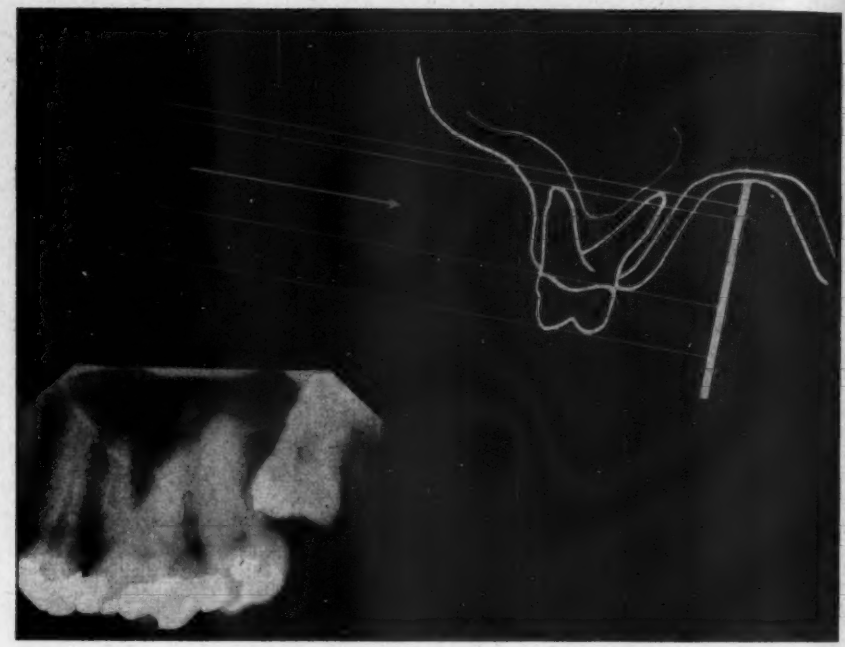

Figure 4

Increased Object-Film Distance

The mechanics employed in placing the film out away from the teeth and parallel to their long axes are easy to put into practice and will be explained in detail later for each region in the mouth. A type of filmholder and cotton rolls are used to keep the film in specific positions (Fig. 5). It should be stressed that in all parts of the mouth, with the exception of the lower molars, the film is positioned well away from the teeth. This can be considered the second rule that is important to follow, since only from increased object-film distance can the film be positioned parallel to the long axes of the teeth.[8] Also, it is the positioning of the film packet in this manner (Fig. 6) that allows regions beyond the apices of the teeth to be shown roentgenographically without excessive plus or minus vertical angulation — excessive angulation that would result in distortions.

The tissue edge of the film packet is positioned beyond the median suture line of the palate, well away from the teeth and ridge (Fig. 7). This is the usual film placement for the upper molar region in the average size mouth. Occasionally, in mouths that have low, flat vaults or shortened vertical dimensions externally, the film may be placed even farther away. The film packet is positioned in this manner and maintained in place with either a filmholder or with cotton rolls. A hemostat with short jaws about 0.75 inch long is used as a filmholder. On the inner surfaces of the jaws, parallel to their length, are fairly deep serrations that firmly hold the film packet and

8. Fitzgerald, G. M., Dental Roentgenography I: An Investigation in Adumbration, or the Factors that Control Geometric Unsharpness. *J.A.D.A.* 34:1 (January 1) 1947.

metal film backing when the instrument is clamped with the ratchet. A rubber bite-block with two parallel sides is slipped on over the box-lock of the instrument. This instrument will hold the film and metal backing in any required position, whether the mouth has all of the teeth present or is partially or completely edentulous. The filmholder can be used effectively for either side of the mouth, in the upper or lower jaws and in the anterior or posterior regions.

A metal film backing is used routinely with the filmholder as a reinforcement for the soft film packet. The backing assists in maintaining a rigid film so that a flat surface is presented to the roentgen rays. In certain parts of the mouth, such as the upper posterior regions, where pressure from the tongue may have a tendency to bend the film, the use of the metal film backing is a necessity. A fairly stiff or spring metal, such as stainless steel or German silver of 27 gage, has been found to work well as a backing. It is precisely shaped to fit the rubber film packet, but also works well with the paper-covered type of film. As illustrated in Figure 5, one side of the backing is turned at right angles to form the shelf edge; the opposite edge has rounded corners and is feathered slightly. The feathered edge of the metal backing is slipped under the rim of one side of the rubber film jacket to become the tissue side of the film. At the same time, the shelf edge comes to rest against the outer edge

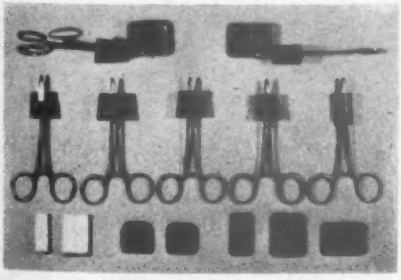

Figure 5

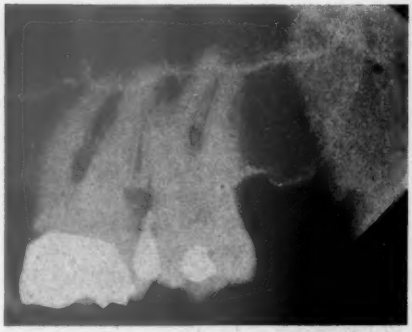

Figure 6

of the opposite side, to become the filmholder side. When clamped on the shelf side of the film and backing, close to the edge, the filmholder is ready to use in the mouth. At the feathered edge, only the soft rubber jacket touches the tissues. With the paper-covered type of film packet, the feathered edge is not in contact with the tissues because the metal backing is slightly shorter than the width of the film.

Another means of positioning the film packet, using increased object-film distance, is with cotton rolls (Fig. 5). The No. 3 size, 1.5 inches in length, can be used for this purpose. Although it is possible to use cotton rolls in all parts of the mouth, they have been found to have certain limitations when used in the upper posterior regions. For instance, in mouths with low, flat palates where the object-film distance is increased even more than is usually the case, cotton rolls ordinarily do not allow the control or latitude in film placement that can be attained by using the filmholder. Also, the film packet, when placed with the filmholder, is more manageable for oblique projections in the upper posterior regions. However, since cotton rolls have proved to be quick, easy and effective to use in the average case, it has been routine procedure to use them in the following parts of the mouth: the upper and lower anterior regions, with the special

narrow size film; the lower bicuspid region, with the regular size film turned vertically, and the lower molar region, where the regular size film is used horizontally. The thumb or index finger of the patient is used in conjunction with the cotton rolls to support the film packet, maintaining it in position in the mouth. The thumb supports the film in all regions in the upper jaw, and the side of the index finger acts as a prop for the film in all regions in the lower jaw. The springy action of the dry cotton rolls plus their bulk makes it possible to place the film parallel to the long axes of the teeth and to use increased object-film distance.

Increased object-film distance offers many advantages that should be emphasized. As mentioned previously, this increase in distance facilitates the paralleling of the plane of the film packet with the long axes of the teeth, but of equal importance is the feature that with the film well away from the teeth, it is then in the most spacious portions of the mouth. This allows considerable latitude in shifting the film around for various oblique projections and in placing the packet in good alinement for all parts to be examined roentgenographically.

When working in the mouth, the operator has to overcome certain handicaps, such as the gag reflex, and many times he encounters certain anatomic limitations. These limitations are the height of the palate, which is fixed and which may be low; the depth in the floor of the mouth, which is compressible but often only to a limited degree, and the width of the dental arches. At times a lack of

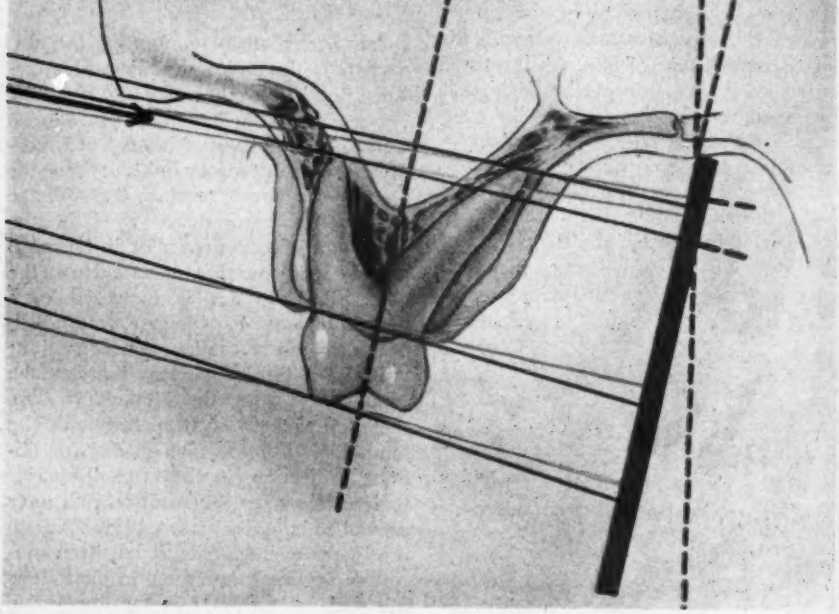

Figure 7

vertical dimension between the occlusal surfaces of the upper molars and the zygoma also becomes a definite obstacle.

With the commonly accepted procedure, the solution to these problems has been to place the film against the teeth and tissues and use rather extreme vertical angulations. This procedure does not overcome the anatomic limitations but merely circumvents them somewhat, with the result that the shadow images are distorted or obscured or both. If in paralleling the plane of the film with the long axes of the teeth the film is positioned as close to the teeth as possible, the result in many cases is as illustrated in Figures 8, left, and 9, left; that is, with the vertical angulation at right angles to the two parallel planes, the apices of the teeth do not show in the roentgenograms. On the other hand, if the film is moved farther away from the teeth, out to and usually beyond the median line, where the palate is ordinarily the highest (Fig. 8, right and 9, right), it is possible to demonstrate that the apices of the teeth and the structures beyond the apices can be shown roentgenographically even though the vertical angulation remains the same.

Figure 10 shows the geometric principles that are involved with changes in object-film distance. Because of the limits in the width of the dental arches, the object-film distance cannot be increased too much, especially if increased focal spot-film distance is used.[8] However, it is possible to position the film or part of it too close to the teeth, and when this occurs, the apices in that portion of the roentgenogram will be cut off. For instance, if only the back portion of the film is too close, not only will more of the roots be cut off progressively toward the distal but also the section of dental arch present in the roentgenogram will appear to have an exaggerated occlusal curve. The teeth will run diagonally upward toward the distal edge of the roentgenogram.

The third rule is to use a flat, rigid film for all regions in the mouth. The film packet should not be bent, contoured or dog-eared to fit, since manipulation of this sort results in objectionable and uncontrollable distortions of the shadow images in the roentgenogram. Instead, a rigid film of the correct size should be fitted to the portion being examined. This is made possible by the use of the films shown in Figure 5. The standard size (1.25 by 1.625 inches), if turned vertically or horizontally, provides two sizes, and the special narrow size (0.75 by

Fig. 8.—Upper molar region, lateral projection. Left: The film packet was maintained in position too close to the teeth with the result that the apices do not show in the roentgenogram. Right: The result of the use of increased object-film distance, all other factors remaining the same. The shadow in the lower left corner was cast by the jaws of the filmholder

Fig. 9.—Upper anterior region. Left: The rarefaction at the apex of the lateral incisor does not show roentgenographically when the film packet is maintained too close to the teeth. Right: When the object-film distance is increased, more of the region above the apices can be examined

1.625 inches) offers an additional size. The regular size turned either way, as indicated to fit the portion to be examined, is used routinely for all the upper and lower posterior regions, and the special narrow size is invaluable for the upper and lower anterior regions. Since actually three sizes of film are available for use and since the film is placed usually out in the roomiest part of the dental arches away from the teeth and tissues, it is not necessary to consider bending or contouring the film packets to fit even small mouths. By the addition of suitable tabs, bitewing films are fabricated from the two sizes of film. The regular size is used for bitewings in examining the mouths of older children and adults, and the special narrow size makes an ideal bitewing film for smaller children. This type of film has been available to the profession for some time from the usual sources.

Summary

Little training and no practice are required to produce a dental roentgenogram of poor quality. To date, with only

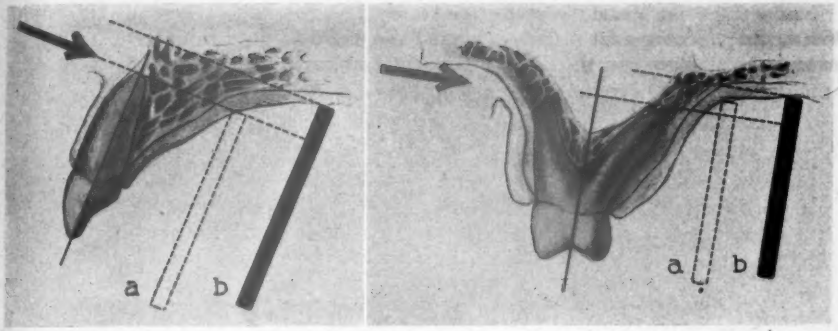

Fig. 10.—With the film packet placed in the "a" position, the apices will not show in the roentgenogram, but with an increased object-film distance as shown by the "b" position, it is possible to demonstrate the apices of the teeth and the structures beyond

a few exceptions, there has been no opportunity to obtain adequate training in dental roentgenography. Consequently, many in the profession who use this diagnostic aid invariably obtain technically incorrect and inconsistent results.

As a result of the limited information readily available concerning technic, probably more effort has been directed toward interpretation than toward improving technical procedures, in a vain attempt to interpret that which is distorted or not clearly visible in the roentgenograms. Fundamentally, it is necessary first to record the shadow images with a technically correct procedure so that the evidence is distinctly apparent. It is then possible for the operator, by observation and careful study, to solve more successfully the interpretive problems presented in the roentgenograms. The interpretive quality of the roentgenogram progresses consistently with increasing proficiency in operative ability.

Experience in training operators has established the fact that no special natural endowments are required to become an expert and that the only qualifications necessary are a knowledge of the fundamental principles involved and their consistent and precise usage. That there is a need for this knowledge and experience can be proved by comparing the quality of the average dental roentgenograms with those made by an operator who has become proficient by the study of, and from close adherence to, factors that conform to correct basic geometric principles. Essentially, these factors are angulation and film placement; they control the degree of anatomic accuracy and are summarized as follows:

First, the inclination of the long axes of the teeth to be examined roentgenographically should be determined clinically. This inclination is the guide for subsequent steps in the procedure, and if judged inaccurately, will materially affect the roentgenographic aspect of the projected images.

Second, the film packet should be positioned in the mouth so that its plane is parallel to the long axes of the teeth to be examined roentgenographically. At the same time, the film should be positioned well away from the teeth in all parts of the mouth, except in the lower molar region. Film positioning of this sort facilitates the paralleling of the two planes and ordinarily places the film packet in the most spacious regions in the mouth. The filmholder or cotton rolls are used to position the film in this manner.

Third, a rigid film should be used. With the film presenting a flat recording surface to the roentgen rays, the distortions usually caused by any bending of the film are eliminated. A rigid film of the correct size should be fitted to the region, not haphazardly bent or molded into place.—*The Medical Center.*

THE DENTAL ART IN ANCIENT EGYPT

Bernhard Wolf Weinberger, D.D.S., New York

IN CONTRAST to the definite knowledge we possess of an early dental art in Phoenicia, Assyria, Greece, Tuscany and Italy, we are confronted in Egypt with a series of apparently contradictory facts that until now have been difficult to coordinate. On the one hand, statements are to be found throughout our literature that the ancient Egyptians did practice dentistry, either filling teeth or doing prosthesis. Just as confident are those who claim that this cannot be true. Under the circumstances, the dental profession can hardly know who and what is correct.

As Brown[1] has contributed the clearest presentation of the antiquities of dental prosthesis, his deductions relative to Egyptian dentistry should prove of particular value. When Brown wrote the following he felt quite certain that "there is no proof in extant relics or indubitable records that the ancient Egyptians practised anything in the way of dental prosthesis, or even ligated loose teeth; the only appliance for the latter purpose found in Egypt being the one described above, from a Roman grave of the first century A.D. (Fig. 5). Nevertheless we have some statements regarding artificial teeth in the mouth of mummies that cannot be entirely ignored."

Why Brown overlooked one significant item that Junker presented, which I will later report, cannot now be understood. His untimely death interrupted his investigation, for had he lived, it is certain he would have found the evidence that he hoped and felt was there.

Another piece of evidence that fills in a gap to complete the chain also apparently escaped the attention of Brown as well as of others interested in the subject. It is an article by Clawson,[2] presented in 1933. From the evidence Clawson then had he also was justified in stating: "Phoenicia, it would seem safe to say, borrowed only her therapeutic and not her mechanical knowledge of dentistry from Egypt. To this she added the simplest form of retentive prosthesis and passed the combined knowledge along to other Mediterranean peoples . . ." We will learn, however, that "retentive prosthesis" did not begin with the Phoenicians.

From letters received from those who had conducted explorations in Egypt (British Museum, University of Pennsyl-

1. Brown, L. P.: The Antiquities of Dental Prosthesis. *D. Cosmos* 76:830 (August) 1934.

2. Clawson, M. D.: A Phoenician Dental Appliance of the 5th Century B.C. Am. D. Soc. Europe Tr., 142-160, 1933. Phoenician Dental Art. *Berytus* 1:23-32, 1934.

vania and Metropolitan Museum of Art, New York) I likewise felt until recently as did Brown, Clawson and others. The opinions expressed coincided with statements made by many Egyptian field workers such as the distinguished craniologist, Emil Schmidt,[3] who said, "In no jaw have I ever found anything that could be attributed to the work of dentists: no fillings, no filing or trephining of teeth, no prosthesis." Like opinions have been recorded by Ruffer,[4] Smith[5] and Ebers.[6]

Let us for that reason first review such assertions that dental work has been found in the mouths of Egyptian mummies and see where they lead us.

How Such Evidence Found Its Way Into the Literature

Since 1840, scattered throughout dental literature one repeatedly can find assertions that the Egyptians either "stopped" teeth with gold or used some type of dental prosthesis. These statements ultimately found their way into our histories and thus became traditional. As far back as 1780, Blumenbach[7] wrote "that before his time artificial teeth had been discovered in Egyptian mummies," though he failed to say by whom.

In 1808, Duval[8] is supposed to have written: "We are informed that in some Royal mummies taken from the catacombs of Egypt, sets of artificial teeth were of wood carved to fit the roofs of mouths, while the teeth, which were of brass, were generously attached." I have not succeeded in locating this assertion in Duval's writings.[9]

Beginning in 1851, Linderer[10] attributed to one, G. B. Belzoni, the fact that he had found in some Egyptian mummies such prosthetic work. The article most frequently quoted is that of Wilkinson [11] who, in 1854, remarked "and it is a singular fact, that their (Egyptian) dentists adopted a method not very long practiced in Europe of stopping teeth with gold . . . etc." As time went on, the Italian explorer, Belzoni, either had "discovered rudely manufactured teeth . . .;"[12] "a set of artificial teeth, the base of solid gold and the teeth of ivory"[8] or "had seen not only artificial teeth but even gold filling in the teeth . . ."[13]

Similar statements later were repeated by Perine,[14] Cigrand,[8] Ambler[15] (page 246), Koch[16] (page 8) and many others. However, each attributed the source of his assertions to Belzoni. One naturally could not help but wonder what Belzoni actually had written. A copy of the first edition of his "Narratives"[16] (1820) was located after considerable difficulty. In discussing the many activities of these ancient people, Belzoni wrote, "I have been fortunate enough to find many specimens of their (Egyptian) manufactures, among which is leaf gold nearly as thin as ours." Nowhere could I find a discussion of Egyptian dentistry. Apparently one of our early practitioners, on reading this

3. Schmidt, Emil: Die Mechanische Bearbeitung der Zähne bei Naturvölkern. *Cor.-Bl.f.Zahnheilk.* 11:163, 1893.

4. Ruffer, A.: Palaeopathology of Egypt. *Am.J.Phys. Anthropol.* 3:340, 377, 1920.

5. Smith, G. E., and Dawson, W. R.: *Egyptian Mummies.* New York: Dial Press, 1924, p. 159.

6. Geist-Jacobi, G. P.: *Geschichte der Zahnheilkunde.* Tübingen: Franz Pietzcker, 1896. p. 9.

7. Blumenbach, J. F.: *Göttingesches Magazin der Wissenschaften und Literatur.* 1:110, 1780.

8. Cigrand, B. J.: *The Rise, Fall and Revival of Dental Prosthesis.* Chicago: The Periodical Publishing Co., 1893, p. 96.

9. Duval, J. R.: *Historiques sur l'art du dentiste chez les anciens.* Paris: Migneret, 1808.

10. Linderer, Joseph: *Die Zahnheilkunde. V. Geschichte und Literatur.* Erlangen: J. J. Palm & Ernst Enke, 1851, pp. 348-349.

11. Wilkinson, Gardner: *Popular Account of the Ancient Egyptians.* London, 1854, 2:350.

12. Robinson, James: Inaugural Address. *Quart J.D. Sc.* 1:41, April 1857. *The Surgical, Mechanical and Medical Treatment of the Teeth.* London: W. Webster, 1846, pp. 8-9.

13. Kingsbury, C. A.: Professional Etchings. *D.Cosmos* 10:348, July 1868.

14. Perine, G. H.: History of Dentistry from the Earliest Period to the Present Time. *New England J.D.* 2:163, June 1883. A Glance at the History and Progress of Dental Science from the Earliest Ages to the Present Time. *New York D.J.* 1:6, July 1858.

15. Koch, C. R. E.: *History of Dental Surgery.* Fort Wayne: National Arts Publishing Company, 1910, 1:8, 246.

16. Belzoni, G. B.: *Narratives of the Operations and Recent Discoveries Within the Pyramids, Temples, Tombs and Excavations in Egypt and Nubia.* London, 1820, p. 172.

statement, immediately concluded that if these ancient people had gold leaf they naturally made the same use of it as many of the dental practitioners of his day. Each succeeding author evidently then added to this his own personal opinion until the fact became established. Up to now the earliest authentic record of the use of gold fillings in teeth is the statement found in the work of Arculanus[17] (1483), although there is in the fifth chapter of the first dental book, the Zene Artznei series 1530-1576, the dubious reference to Mesue.[18, 19] As for a gold denture, I have seen no reference before 1790.

Thus, we have an excellent example of confusion, brought about through pure imagination. May our future histories eliminate such references to early Egyptian dentistry.

The Dental Art of the Pyramid Age in Egypt

The earliest medical records we possess are those that were found in Egypt, Babylonia and Assyria. We are able, therefore, to trace accurately the history of medicine from the time of Imhotep (Imutes) who lived during the reign of King Djoser (2700 B. C.) and is considered by some to be Egypt's most famous medical representative and promoter though not the actual founder of medical practice.

Tradition, however, takes us back beyond the period of Imhotep, and although some of the stories "belong to the realm of mythology, they at least offer proof of the fact that during the earliest periods of Egyptian history the physician enjoyed an enviable reputation."[20]

The practical experiences of the earliest Egyptian physician as well as of the medical quack, their diagnoses, prescriptions and cures, the magic formulas and conjuring recitations of the magi, according to Steindorff,[20] had "been collected and were compiled into practical handbooks for future practice." There developed as a result a rather extensive medical literature, a considerable part of which was preserved in papyrus manuscripts. These handbooks are now known as the "Papyrus Ebers" (University of Leipzig), the "Berlin Medical Papyrus" (State Museum, Berlin #3038), the "London Medical Papyrus" (British Museum #10059), the "Hearst Medical Papyrus" (University of California), and the "Edwin Smith Surgical Papyrus" (New York Historical Society Library).

The "Edwin Smith Surgical Papyrus," as it has come down to us, dates from the seventeenth century B.C. The original author's first manuscript, however, was written at least a thousand or thirteen hundred years earlier, some time within the Pyramid Age. The beginning and the end of the original text have been lost and the present manuscript fails to disclose the name of the author. Breasted,[21] the outstanding American Egyptologist, conjectures that it may have been Imhotep himself and that this papyrus is the earliest known truly scientific writing, a fascinating revelation of the human mind struggling with the first stages of science building. Therefore, it appears that the author was a learned, systematic, thinking physician or surgeon.

The "Papyrus," being purely a surgical treatise based on firsthand information, contains nothing that relates to the teeth; however, there are many case reports of interest to oral surgeons. It is a carefully designed surgical text that deals with diagnosis, treatment and prognosis of the

17. Arculanus: *Practica*. Venice, 1483.

18. Weinberger, B. W.: Early Dental Literature. *Bull. M. Library A.* 26:235-236, May 1938.

19. Weinberger, B. W.: Fundamental Changes in General Practice from Its Concept in 3000 B.C. *D. Items Interest* 65:343-347, April 1943.

20. Steindorff, Georg: Physicians and Medicine in Ancient Egypt. *Ciba Symposia* 1:10, 299-304, January 1940.

21. Breasted, J. H.: *Edwin Smith Surgical Papyrus*. Chicago: University of Chicago Press, 1930, 1:Foreword.

common types of injuries and fractures. There are twelve references to wounds of the mouth and twenty-five to the mandible, such as concerning ligaments, articulation, dislocation, fractures and their manipulation. A few of the case reports read:

Case 15. Perforation of the Bone in the Region of the Maxilla and Zygoma.
Case 16. Split of the Bone in same region.
Case 17. Compound comminuted Fracture of same region.
Case 24. Fracture of the Mandible.
Case 25. Dislocation of the Mandible.

The "Ebers Papyrus," on the other hand, some consider to be a text on internal medicine, while the "Hearst Medical Papyrus" is a loosely arranged practitioner's textbook, containing prescriptions gathered from many sources or even from lectures. It is, however, from them that we obtain our knowledge of the therapeutics known to these ancient practitioners. There are numerous references to dental disturbances, such as gingivitis, erosion, pulpitis and "toothache," showing that Egyptian medicine was keenly interested in diseases of the teeth as well as in surgical procedures of the face, jaws and mouth.

"He Who Deals with Teeth, the Dentist"

The writings of Herodotus are our earliest record that Egypt was the home of medical specialists. Since this passage is well known, it does not need repeating at this time. However, not until 1927 is there confirmation of his statement as far as it relates to "the physician for the teeth" (Fig. 1).

From a grave in an Old Empire cemetery near the Pyramids of Giza, or Gizeh, Hermann Junker discovered the tomb of a court physician and oculist of the 6th Dynasty (c. 2600 B.C.) named *Pepi-ankh*, better known under the short name of *'Irj* or *Iry*. Carved upon his stele, or tombstone, were significant pictographs. These led Junker to study and compare them with others found on similar steles. As a result he concluded that specialization in Egyptian medicine was already existent two thousands years before Herodotus. We will consider, however, only those steles which he enumerated in his studies that pertain to our profession.

In a preliminary report in 1914[22] Junker first presented some significant facts that escaped the attention of dental writers. Even his important article of 1927[23] was lost to dentistry until 1933 when L. Parmly Brown, visiting the Cairo Museum, had his attention drawn to it. To Brown I am personally deeply indebted for the article, for it opened up a new avenue of approach to the study of Egyptian dental history.

Until Junker's study of *Iry's* tomb stele, proof seemed to be lacking of the existence in the Old Empire of two of the specialties enumerated by Herodotus, namely, that of the "physician for the eyes" and the "physician for the teeth." On finding the former on *Iry's* stele, Junker began to examine others until he succeeded in locating some that contained the names and official titles of dental practitioners.

Junker finally decided that there was one hieroglyph that surely stood for both the eye and the tooth in all instances, and he recorded the following specialties of medicine: A. "Physician for the Eyes." B. "Physician for the Body." C. "Physician for the Teeth." Preceding each of the Egyptian titles is its Greek equivalent (Fig. 1).

In discussing Egyptian words some question arises regarding the writing and the interpretation of pictures. Egyptian writing was originally purely pictographic, each picture signifying the thing it depicted or suggested. These pictures

22. Junker, Hermann: Expedition der Wiener Akademie. 1914 auf dem Friedhof von Gizeh. Vorbericht: 31, 1914.

23. Junker, Hermann: Die Stele des Hofarztes 'Iry. Sect. 5. Das Spezialistentum in der Aegyptischen Medizin. *Ztsch. f. Aegypt. Sprache u. Altertumsk.* 63:68-70, 1927.

called "hieroglyphs" are at times difficult to translate and interpret into modern English.

In order that the hieroglyphs might be more readily understood by readers, I prepared a glossary (Fig. 1), with identifying numbers on the left which will be used in quoting the translations. In this paper only the fifth section of Junker's[23] monograph (pages 69 and 70) will be considered. This consists of a brief study of the word "tooth" as found in inscriptions on tombstones or steles. The designations of dentists that Junker used were those from original records already published in books.

Junker began by first discussing Spiegelberg's[24] remarks concerning specializa-

24. Spiegelberg, W.: Zum dem Specialistentum in der Aegyptischen Medizin. *Ztschr. f. Aegypt. Sprache u. Altertumsk.* 53:111, 1916.

Es ergeben sich somit zu den von Herodot II, 84 genannten Spezialisten folgende Entsprechungen aus dem Alten Reich:

A. ἰητρὸς ὀφθαλμῶν

B. „ τῶν κατὰ νηδύν

C. „ κεφαλῆς

„ τῶν ἀφανέων νούσων

usw.

GLOSSARY.

1.		ARROW.	=	PHYSICAN.
2.		HIEROGLYPHIC EYE	=	ONE WHO MAKES OR HANDLES. DENOTATION OF TREATMENT.
3.		TUSK	=	TOOTH OF MAN "TOOTHER". HE WHO DEALS WITH TEETH.
4.		EYE & TUSK.	=	TREATER OR MAKER OF TEETH. "TOOTH MAKER."
5.		BIRD.(MARTIN).	=	"GREAT-ONE" OR "CHIEF".
6.		HOUSE & MACE.	=	ROYAL PALACE.
7.		BIRD & TUSK	=	"GREAT ONE" OF TOOTHERS" "DENTIST."
8.		BIRD, EYE & TUSK.	=	"CHIEF" OF THE TREATER OF TEETH.
9.		HOUSE, ARROW, BIRD & TUSK.	=	"CHIEF" OF THE TOOTHERS OF THE ROYAL PALACE.
10.		BIRD, TUSK, ARROW.	=	"CHIEF" OF THE TOOTHERS AND PHYSICIAN.

B.W.W.

Fig. 1.—Above: Medical specialists as mentioned by Herodotus (Junker). Below: Glossary showing hieroglyphs with corresponding translations.

tion in Egyptian medicine, especially the passage with regard to Herodotus:

This makes it appear that specialization of the medical profession was so far advanced that some diseases were treated by physicians who dealt with nothing but their specialty. However, we need not take this too literally, for side by side with the specialists, there surely were very many general practitioners also in Herodotus' time. From the stele of *'Irj* it would appear that things were different, in the Old Kingdom, in any event, and that a physician could be a specialist in several lines. On the other hand, however, the titles of that period definitely indicate the beginnings of greater specialization, and it is interesting to note that the medical specialties mentioned by Herodotus had for the most part already made their appearance at that time.

"Thus we lack proof," Junker said, "of the existence in the Old Kingdom only for two of the specialties enumerated by Herodotus, i.e., 'physician for the eye' and 'physician for the teeth.' " With respect to the latter, however, a concordance can be established. (H) Erman Grapow,[25] under the title *wr-sinw*, gave one writing *sinw* with (3) Toother, as substantiated by the title of *Hsj R'* (Hesi-Re) (8) "Chief" of the Treater of Teeth. Other instances he recorded are (7) "Great One" of Toothers, (9) "Chief" of the Toothers of the Royal Palace, (10) "Chief" of the Toothers and Physicians. Junker stated that the sign indicated by (3) surely stands for tooth in all instances.

Junker continued as follows:

It seems certain that (3) (Toother) is not merely an ideograph with the phonetic value of *sin, swn,* or the like; this possibility is definitely excluded by the title of *Hesi-Re,* since the ideograph *sinw* appears already expressed by (1) (physician); moreover, in the inscription where the title (7) (Great One-Chief-of the Toothers) or similar ones occur, *sinw* is invariably represented by (1) (physician) (See Kairo 1482, Saggara. 1. Pl. 14. Vatican 92).

25. Grapow, Hermann: *Aegyptischen Handwörterbuch.* Leipzig, 1921, p. 143.

On the other hand, this title must have reference to the medical profession, for it occurs only in connection with persons whose occupations are attested by other titles as well. . . . In *Hesi-Re* the titles are contracted into (10) "the greatest of toothers and of physicians" precisely because they refer to related matter.

The obvious course would be to consider (3) (toother) a derivative form of *ibh,* tooth, probably the Nisbe-Form *ibhj* "he who deals with teeth, the Dentist." That such derivative forms may express such a relationship to the subject designated by the simple noun, is clearly evident from analogies, e.g.—'h.t. the field, hence *hwtj* "he who cultivates the field" i.e. the peasant.

This interpretation is confirmed by the title variant (4) (Treater or Maker of Teeth); it eliminates any possibility of a connection with the ideographic character for *sinw,* and positively establishes the title (3) (toother) as a character in its own right. . . . Regarding the inscription as found in another tomb . . . referring to the occupant of the tomb and his wife there reads "one who treats teeth." In these instances, *irj* likewise means "to treat, to ward" and not "to make, to fashion."

Junker then deduced as follows:

The objection might be raised that to surmise the existence of a specialist of dentistry at that time, would be too venturesome. To this we may answer that care of teeth plays a great role among many African Negro tribes, where the teeth are polished with a special kind of wood. Moreover, it is evident also from prescriptions preserved that Egyptian medicine was keenly interested in diseases of the teeth. The Papyrus Ebers, P. LXXXIX, 3 ff. describes remedies for toothache, inflammation, bleeding, etc.; see also LXXII, 14, 16-18; Papyrus Hearst, recipe 9 (Ebers LXXXIX, 10). Apart from this, attention is also given to remedies of teeth: "A remedy to tighten a tooth that is about to fall out," Papyrus Ebers LXXXIX, 1-2, Hearst, recipe 8.

The degree of perfection in the treatment of teeth attained in the Old Kingdom, is demonstrated by a discovery on the cemetery of Gizeh, in a shaft east of the mastaba of *Wns.t,* made by the expedition of the Wiener Akademie, in 1914; see preliminary report, p.31. *Two teeth were ingeniously held together by gold wire; obviously, one was a loose*

tooth which, by being fastened to its sound neighbor, was kept from falling out." (Italics not in original.)

Another illustration is the skull of Gizeh, which shows evidence of an operation for evacuation of an abscess under the first molar (Edwin Smith Papyrus).

In view of this evidence we stand on firm ground in accepting (3) (toother) and (4) (one who treats or handles teeth), as the dentists of the Old Kingdom. (8) (Chief of the treater of the teeth) indicates that they were specialized like the other physicians, while (9) shows that there were special court dentists.

The *Hsj-R'* (Hesi-Re) Junker mentioned was perhaps among the earliest physicians who specialized in dentistry, somewhere around 3000 B.C. A photograph of his tomb stele appears in Quibell's [26] article entitled "Excavations at Saqquara; The Tomb of Hesi." It shows the deceased seated before a table. His name is immediately above his head, and on the upper half of the panel are fourteen of his titles. That on the right upper corner, reading downward, shows a bird, a tusk and a chisel head arrow (Fig. 2), the three hieroglyphics thus arranged forming the title of "Toother of the Physicians." The fact that the toother and the physician are named together, with the former preceding the latter, seemed to Junker to indicate that Hesi-Re was a physician who specialized in dentistry.

The fact that the Egyptian palace dentist might have at the same time served as "chief of the palace physicians" was also noted by Breasted.[21]

In order to assure myself as to Junker's correct interpretations, I submitted the subject to Prof. Hermann Ranke, one of the world's leading Egyptologists and at the time Visiting Professor of Egyptology at the University of Pennsylvania. He had made the following statement in 1933: "Besides the above-mentioned titles of specialists of the Old Kingdom, we also find 'dentist' (tooth specialist) which occurs in a number of tomb inscriptions."[27] Ranke replied that he had re-examined Junker's evidence and "was convinced that Junker was correct when he stated that (3) was intended to read toother (dentist) and (4) treater or maker of teeth (literally toothmaker) and that they occur as titles of Egyptian medical men who specialized in dentistry. That until some new source of information is presented, we will have to leave the matter at a point to which Junker brought it. If this is correct it should be noted that the earliest man of this kind was Hesi-Re' the 'Great One of the Toothist and of the Physician.'" Further confirmation was supplied in articles by deLint.[28]

It is regrettable that Junker did not include the illustrations that were used as a basis for his study. Fortunately, however, Brown[29] later published most of them. For the evidence of dental prosthesis we were forced to wait until recently.

The following are the names and designations of Egyptian dental practitioners that Junker located and arranged chronologically, and also the source as to author and publications.

Hesi-Re (*Hsj-R'*) (10) "Chief of the Toothers and Physicians," 3rd Dynasty, c. 3000 B.C. Capart,[30] Quibell.[26]

Nefer-iret-es ( ) (4) Treater or Maker of Teeth, 4th Dynasty, 2900-2750 B.C. Lepsius.[31]

Ny-ank-Seket (*Nj nh-shm.t*) (9) "Chief" of the Toothers of the Royal Palace, 5th Dynasty, 2750-2600 B.C. Mariette,[32] Maspero.[33]

26. Quibell, J. E.: *Excavations at Saqquara: The Tomb of Hesi.* Cairo, 1913. Pl. 29-32.

27. Ranke, Hermann: Medicine and Surgery in Ancient Egypt. *Bull. Inst. Hist. Med.*, 1:237-257, 1933; *Univ. Pennsylvania Bi-Cent.Conf.* September 30, 1940, pp. 31-42.

28. deLint, J. G.: Beitrag zur Kenntnis der anatomischen Namen in älten Aegypten. *Arch. f. Gesch. d. Med.* 25:382-390, 1932. Egyptische Specialisten. *Bidragen tot de Gesch. der Geneeskunde* 14:48-52, 1934.

29. Brown, L. P.: Appellations of the Dental Practitioner. *D. Cosmos* 78:246-248, March 1936.

30. Capart, J.: *L'Art Egypt.* Cairo, 1922, Pl. 28, 69.

31. Lepsius, C. R.: *Denkmaeler aus Aegypten und Aethiopien.* Berlin, 1849-1859, 3:Pt. II, Ill. 85.

32. Mariette, A.: *Les Mastabas de l'Ancien Empire.* Paris, 1884, pp. 203-205.

33. Maspero, G.: De Quelques Termés d'Architecture Egyptienne. *Bibliothèque Egyptologique* 8:333-339, 1900.

Fig. 2.—"Chief of the Toothers (dentist) and Physicians." *Hesi-Re,* 3000 B.C. (Quibell).

Ankh-Men-Kau-Re (4) Treater or Maker of Teeth. Same stele as Ny-ank-Seket.

Khuy *(Hwj)* (8) "Chief" of the Treater of Teeth and "Chief" of the Physicians of the Royal Palace, 6th Dynasty, 2600-2460 B.C. Quibell,[26] Pl. 14.

Psametik-sonbe (*Psmtk-snb*) (9) "Chief of the Toothers of the Royal Palace" and (10) "Chief of the Toothers and Physicians," 26th Dynasty, 663-525 B.C. Marucci.[34]

34. Marucci, O.: *Catalogo del Museo Egizio Vaticano.* 1902, pp. 63-67.

Thus we find records or inscriptions with dental designations upon tomb steles from 3000 B.C. to c.525 B.C. During this period some of these dental specialists held various titles. Brown prefers that the equivalent of (3) should be "toothist," and of (4), "tooth-workers" or "dental operators." In this I am not in accord. Junker has shown a number of variants for "tooth," namely, (3) (the tusk) he who deals with teeth, (4) (eye and tusk) treater or maker of teeth or (8) one who treats teeth. Ranke[27] stated that (3) was intended to be read "toother," and (4) treater or maker of teeth (literally tooth-maker). Whether the latter is intended for a more specialized individual such as those who likewise were engaged in dental prosthesis is unknown. I am somewhat inclined toward that interpretation. I also prefer to accept Ranke's terminology of "toother" instead of Brown's "toothist," since there is a precedent established in the oldest medical work in English. Whoever translated Guy de Chauliac's "Chirurgia Magna" (Guy de Chauliac Surgery, 146?) provided the answer of "barbers and tooth-drawers" and also "toothers or tooth-drawers."[35] Here again there is a differentiation in a specialized group; that is, those who confined themselves to general dentistry and those who practiced exclusively the extraction of teeth.

The next question is whether these practitioners left behind any concrete evidence of their handiwork.

Evidence of the Practice of Oral Surgery

The possibility that these ancient Egyptians might have possessed some knowledge of the dental art was first advanced by Thoma in 1917.[36] At that time he called attention to an interesting mandible, found in an old Egyptian tomb at Giza, or Gizeh, which had been acquired by the Peabody Museum of Harvard (#59303) with some 250 skeletons of the ancient Egyptians.

In Thoma's description, the mandible was referred to as belonging to the Middle Empire (2200-2000 B.C.). E. A. Hooton placed it earlier in the Old Empire (2500-2200 B.C.), and J. H. Breasted stated that it might have been from an individual who lived as early as the 4th Dynasty (2900-2750 B.C.).

The legends of Thoma's illustrations read as follows:

Fig. 5 Ancient Egyptian, Middle Empire, mandible showing abrasion on the right first molar. A tiny hole is shown where the mesiolingual horn of the pulp has become exposed.

Fig. 6 same as Fig. 5. Side view of mandible showing two holes, one between the two roots of the first molar and one between the mesial root and bicuspid. The holes look artificial and may indicate a surgical procedure to give drainage to the pus.

Fig. 7 same as Fig. 5. Roentgenogram of the same mandible, showing the abscess area and also the position of the holes.

Thoma's Figures 6 and 7 are those shown in Figure 3.

The observations made by Thoma became the basis of a more detailed study by Hooton.[37] Fortunately as the right ramus was broken, the infected area was clearly visible. This permitted Hooton to examine the specimen to see whether "the holes could have been the result of the abscess eating its way naturally through the lateral wall of the alveolar process" or "that the anterior hole could be a supernumerary mental foramen." The following explanation was offered:

When the individual was suffering from an abscess an attempt was first made to relieve by boring the anterior hole between the premolar and molar. This hole was bored downward from an angle about 15° with the sagittal plane. The result was a clear cut, round hole,

35. Weinberger, B. W.: Did Dentistry Evolve from the Barbers, Blacksmiths or from Medicine? *Bull. Hist. Med.*, 8:970, 976, 978-979, July 1940.

36. Thoma, K. H.: Oral Diseases of Ancient Nations and Tribes. *J.Allied D.Soc.* 12: 327-334, September 1917.

37. Hooton, E. A.: *Oral Surgery in Egypt During the Old Empire.* Cambridge: Harvard African Studies, 1917.

which passes downward through sound tissue, and taps the lower anterior border of the abscess, but in such a way that the pus could not have drained out through this hole. As this measure was ineffective another hole was bored a little higher up and farther back, between the roots of the first molar. This penetrated the middle of the abscess, and the pus discharging absorbed some of the tissue of the walls of the hole. . . .

Hooton's deductions were that "the evidence of this specimen seems to establish beyond a reasonable doubt the existence of a rudimentary knowledge of oral surgery in the Old Empire."

Breasted,[21] in his remarkable study of the "Edwin Smith Surgical Papyrus" (pages XII, XIV, 8, 9 and 53) mentioned Hooton's findings and commented:

Of instruments the treatise mentions only the "fire drill," employed when hot for cauterization. A mandible of the 4th Dynasty (2900-2750 B.C.) disclosing a drill hole in the mental foramen for the purpose of draining an abscess under a molar tooth (See Plate I. Fig. 1) makes it evident that specialized instruments of metal, presumably bronze, already existed in the age which produced our surgical treatise, but they are taken for granted by the ancient author.

Again Breasted, on pages XIII-XIV, in accepting Junker's findings, of which I will have more to say a little later, wrote:

We should mention in this connection the recent discovery of an Old Kingdom palace physician's tombstone at Gizeh by H. Junker. . . . This specialization in the Old Kingdom is further illustrated by the existence of the "palace-dentist" who might at the same time serve as "chief palace physician." The reader will find an example of the remarkable work of the dental surgeon as far back as the Fourth Dynasty . . . in the extraordinary mandible showing the alveolar process pierced to drain an abscess under the first molar. These facts demonstrate the existence of a body of medical knowledge in the Old Kingdom already as large and detailed as to require specialization.

At the time I published Hooton's specimen[35] (page 970) some expressed skepticism that the two drill holes were the effort of an artisan, their belief being that the holes were made by a necrophilous beetle. On account of the importance of this evidence, although Breasted, Junker and others had accepted Hooton's opinion, I requested that since both Hooton and Thoma had made their report in 1917 they again examine the mandible and consider this interpretation, as well as whether it might not be a supernumerary foramen. Their reply after re-examination was that they "still adhered to their original opinion" and

Fig. 3.—Human mandible, 2900-2750 B.C. The two "borings" above the mental foramen are supposed to be the work of a "specialized" dental physician or surgeon. Specimen in the Peabody Museum, Harvard University (Thoma).

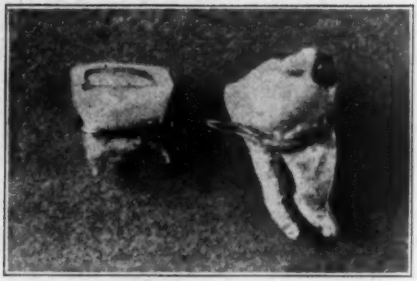

Fig. 4.—Egyptian retentive prosthesis, c. 2500 B.C. Second and third lower left molars linked together (Junker).

"could see no particular reason to change our mind in regard to the interpretation of the specimen"[19] (page 118). Therefore there is not the slightest doubt that some individual in Egypt actually had had an operation performed for the purpose stated.

"Retentive Prosthesis" by a Pyramid Dentist

There still remains unanswered the questions of whether these Egyptian dental specialists practiced prosthetic dentistry; if so, whether there are any authentic specimens of Egyptian workmanship, and in what way it resembled the "retentive prosthesis" of the Phoenicians, Grecians and Romans.

The evidence Brown overlooked and to which I called attention in a previous article[19] was first mentioned by Junker in his report of 1914[22] in which he mentioned "two teeth that were ingeniously held together by gold wire; obviously, one was a loose tooth which by being fastened to its neighbor was kept from falling out." Junker, however, failed to include in this report and also in his 1927 article[23] the photograph so badly needed as evidence. It was not until two years later that an actual photograph of the specimen appeared in print. It remained lost to dentistry, however, until recently when it was located in the Library of the Metropolitan Museum of Art. There are undoubtedly many more records in archaeologic literature that likewise have escaped the eyes of dental writers, and unless one is seeking some definite fact or writer or has his attention directed to some specific article, there is no way of knowing about them.

Apparently it was not until 1929 that Junker completed the studies of his discoveries at Giza, and finally published his findings.[38] In volume 3, *Bericht über die Grabungen auf dem Friedhof von Giza*, (pages 256 and 257) there appears his report on Shaft (tomb) 984. Plate 50A shows a few of the articles, including two teeth, which were found in the Shaft. Junker believed that all the articles found in that particular Shaft were of either the late 4th or early 5th Dynasty (c. 2500 B.C.). Both teeth must have been in the Pelizäus Museum in Hildesheim, Germany, in 1928, since its director at that time requested Prof. Herman Euler, Director of the Zahnärztlichen Universität Institutes in Breslau, for an expert opinion. Professor Euler's reply is a part of Junker's description of the Shaft. It seems strange indeed that Euler failed to comment further on this extremely important evidence, especially since he later wrote an article on third molars of the last 4000 years.

Euler was positive that both teeth belonged to the same individual, judging by their color and anatomic form (Fig. 4), and that one was the lower left third and the other the lower left second molar. They were linked together by gold wire, woven around the gingival margins of the teeth. The crown of the third molar or wisdom tooth showed extreme wear with its roots absorbed. Because of some pathologic condition, this tooth became loose and had to be held in place by attaching it to its neighbor, the second molar, a method still in practice, he said, in present-day dentistry. The tartar on both the teeth and gold wire

38. Junker, Hermann: *Giza I. Die Mastabas der IV Dynastie auf dem Westfriedhof.* Vienna, 1929 (3 vol.).

indicated that the dental work was performed in the mouth of a living person. Euler also noted the present amount of space between the teeth. The report was signed at Breslau, October 15, 1928.

The illustration is not sufficiently clear to show whether the wire between the teeth is still intact, but from the description in Junker's preliminary report both teeth were then together.

I now believe we have sufficient authenticated evidence (the actual names of dental specialists from 3000 B.C. to 525 B.C.; the mandible of the 4th Dynasty, perhaps even earlier, on which a surgical operation had been performed; evidence of dental diseases and therapeutic treatment dating back to the 3rd Dynasty, and at last a specimen of actual dental prosthesis performed around 2500 B.C.) to say definitely that dentistry had its origin in Egypt as an independent specialty of medicine.

As Ranke[37] pointed out with regard to Egyptian surgery and medicine, the same thing happened with Egyptian dentistry; that is, for some unknown reason this advanced development of dentistry suddenly stopped and what had been built up during the course of several millenniums eventually was destroyed. Retentive dental prosthesis was not entirely lost, however, for we find that this knowledge was passed along to other Mediterranean peoples with whom Egypt maintained commercial intercourse, especially Phoenicia, Greece and Etruria.

Was Dentistry Practiced in Egypt During the Period of Decadence?

In the beginning I endeavored to point out that what now appears in dental literature and histories, as far as it relates to this period of Egyptian history, was founded entirely on imagination and invention. Let us therefore return to this same period and see whether there is a sounder foundation for believing that dentistry was practiced at that time. Though the records are vague and uncertain, they do furnish us with sufficient material for discussion.

According to Guerini,[39]

> Egypt was, in its time, a great centre of civilization, whose influence was strongly predominant in all the neighboring region, and especially in ancient Phoenicia and in its large and industrious cities Tyre and Sidon. The remains discovered in many of the Phoenician tombs would of themselves alone be sufficient to demonstrate luminously the enormous influence exercised by the Egyptian civilization on the life and customs of that people. Now, if there were dentists in Sidon capable of applying false teeth, it may reasonably be admitted that the dentists of the great Egyptian metropoli Thebes and Memphis were able to do as much and more, the level of civilization being without doubt higher there than in Tyre or in Sidon, or in other non-Egyptian cities. . . .
>
> Is it likely, therefore, that so refined and ingenious a people should not have found the means of remedying the deformity resulting from the loss of one or more front teeth?

To quote Guerini further:

> As to what concerns dental art, everything leads up to the belief that it was practised by the Egyptians and Phoenicians earlier than by the Etruscans, whose civilization, as already hinted, is certainly less ancient. Nevertheless, in comparing the dental appliances found in the Etruscan tombs with the sole authentic dental appliance of Phoenician workmanship known at the present day, we cannot but be struck with the great superiority of the Etruscan appliances. It is therefore probable that the Etruscans, although they had learned the dental art from the Egyptians and Phoenicians, had subsequently carried it to a much higher degree of perfection than it had arrived at in Egypt or in Phoenicia. An analogous fact has come to pass in our own times. Dental art in America, which emanated from the French and English schools, soon took on so vigorous a development as indisputably to acquire first rank.

In studying the dental art of the Ancients, we have consequently been impressed with the superiority of the Etruscan appliances and have tried to deter-

39. Guerini, V.: *History of Dentistry.* Philadelphia: Lea & Febiger, 1909, pp. 29, 31.

mine how their artisan mastered such advanced technic without a long period of evolutionary development. It does not seem reasonable nor possible for this to have occurred overnight; consequently prosthetic dentistry must have been practiced in Egypt. Evidence of this remarkable progress in Etruscan bridgework disappeared as suddenly as it apparently developed, not again to be seen until toward the end of the last century.

Despite the fact that archaeologic explorations have not disclosed any actual specimens of dental work, there are records of missing teeth being supplied by dental practitioners[38] (pages 978-979).

We know that the "Ancient Hebrews in their medical practices diagnosed and treated diseases of dental manifestation; that the general physician acted as dentist; that dental prosthesis was not unknown and certain types of crown and bridgework were made by certain craftsmen or artisans . . ."[40]

The Palestinian (370-390 A.D.) and the Babylonian Talmuds (352-427 A.D.) contain the following decisions: "She had an inserted tooth, but Rabbi Ishmael (first century) made (for) her one of gold . . ." (Mishna. Nedarin 66.b.)

40. Asbell, M. B.: Practice of Dentistry Among the Ancient Hebrews: A Contribution to the History of Dentistry. *J.A.D.A.* 28:1098, July 1941.

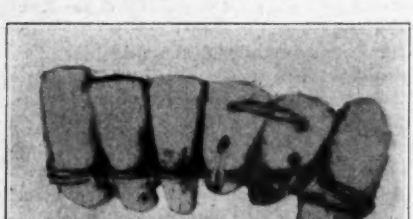

Fig. 5.—Retentive prosthesis supposedly of Phoenician origin but probably Egyptian. Guerini's Figure 4 is incorrect, since the two teeth bound together should be on the right rather than on the left. Specimen in the Louvre.

Again Rabbi Rashi gave the following interpretation of the law: "A gold tooth being valuable, the woman may take it out of her mouth for display, and meanwhile carry it in the streets, but this does not apply to a silver tooth." Such opinions reveal the use of individual gold or silver, fixed or removable crowns, removable bridgework and even of pivot teeth.

If such laws had to be interpreted, apparently the use of tooth crowns of gold or silver and other prosthesis was extremely common in Egypt. The question that cannot be answered is whether they were the work of an Egyptian, Etruscan, Roman or Phoenician dental artisan.

According to Mr. Lansing, Curator of Egyptian Art, Metropolitan Museum of Art, apparently almost all the archaeologic explorations in Egypt were among tombs and graveyards of the earlier periods, most of those of the later periods having been plundered and sacked. For that reason it would have been difficult to determine whether any dental work had been performed. There is also the likelihood that the embalmers systematically removed all prosthetic pieces, for in Egypt there was no such law as found in the Roman Twelve Tables, permitting the burial of persons with gold work in their mouths.

Since retentive prosthesis originated in Egypt, perhaps reappraisal of those specimens found with other Egyptian objects would indicate their Egyptian origin. Figure 5, perhaps the best known example of such ancient appliances, was first described by Gaillardot,[41] Renan's medical assistant. The illustration appears in the writings of Van Marter,[42] Farrar,[43] Deneffe[44] and Guerini[39] as an

41. Renan, J. E.: *Mission de Phénicie, et la Campagne de Sidon.* Paris, 1864, p. 472.

42. Van Marter, J. G.: Further Evidence of Prehistoric Dentistry. *Independent Pract.* 7:57-61, February 1886.

43. Farrar, J. N.: *Irregularities of the Teeth.* New York, 1888, 1:35.

44. Deneffe, Victor: *La prothèse dentaire dans l'antiquité.* Anvers, 1899, Fig. 8.

upper appliance. Dr. E. C. Kirk, in editing the book by Guerini, questioned the anatomic forms of the incisors and decided that they must be lowers. Since then Sudhoff[45] (page 34) and others have so described them.

Gaillardot found in a grave in one of the most ancient parts of the necropolis of Saida (Sidon) the specimen buried in sand with a quantity of small objects, among which were two copper coins, an iron ring, a vase of most graceful outline, a scarab, twelve extremely small statuettes of majolica representing Egyptian divinities, which judging by the holes bored in them probably formed a necklace. These specimens, which are now in the Louvre in Paris, were found in Phoenicia and since then have been ascribed as of Phoenician workmanship of the 4th century B.C.

Another such retentive appliance not generally known in this country and described by Clawson[2] as the Ford Specimen is that shown in Figure 6. Archaeologists date it about the early 5th century B.C. It was found "about a mile south-east of Sidon in Southern Lebanon, and just east of and in full view of the necropolis from which, in 1862, there was taken" the specimen first described.

Clawson's conclusions were:

1. It is one of the few existing dental appliances of ancient times in which we can plainly see that the owner derived service as well as aesthetic benefit by its application.

2. The skeletal remains and the appliance are in such splendid state of preservation that we do not have to draw on our imagination to understand its function.

3. Pyorrhoea . . . was existing and more or less successfully dealt with by dentists 2500 years ago.

4. The type and condition of the tomb . . . allow archaeologists to date the appliance with great accuracy.

5. And last but not least, it is one of the few . . . discoveries which has remained in the country of its origin.

Along with the skeletal remains were many other valuable articles such as "a gold finger ring, twelve small statuettes of Egyptian faience representing Egyptian deities . . . etc.

Both of these appliances were found with specimens of Egyptian artistry which might indicate that they were from persons of Egyptian ancestry, buried in Phoenicia. If so, it is reasonable to believe the dental work was performed by an Egyptian. This phase needs more careful study by one better qualified before one can definitely state that such was the case.

Figure 7 is an example of Greek dentistry of the 4th century B.C. It is much cruder in construction than the two previously mentioned and is assigned to the 4th or 3rd century B.C.

Another appliance, which apparently has not been reproduced, was found in a Roman grave in Egypt and is now in the Greco-Roman Museum at Alexandria. According to International Dentistry, Alexandria, 1933, vol. 6, page 584, it probably belongs to the first Christian Century. It consists of a gold wire, bound around the lower right central and lateral incisors and cuspid.

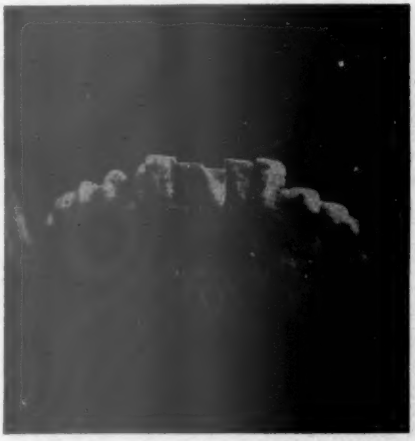

Fig. 6.—Retentive prosthesis of Phoenician origin, found near specimen shown in Figure 5. Specimen in the Archaeological Museum, American University of Beiruth (Clawson).

45. Sudhoff, Karl: *Geschichte der Zahnheilkunde.* Leipzig: J. A. Barth, 1926, pp. 34, 90 (ed. 2).

All of these appliances consist of pure gold wire ingeniously woven around and firmly binding together the anterior teeth. Junker's Egyptian appliance, although constructed in a similar manner, held together the posterior teeth.

The retentive prosthesis of the Romans, on the other hand, was far more practical and efficient (Fig. 8). This is a splint made of rolled gold which, according to Sudhoff[45] (page 90), was 3 mm. in height, contoured to each of the five lower anterior teeth, thus securely holding them in place. There is another similar appliance that extends from the lower first premolar to the opposite premolar, proving that this type of appliance was in general use in Roman dentistry.

If this method was the prevailing one used by Roman dentists, it would hardly seem probable that the appliance found in a Roman grave in Egypt was of Roman workmanship but more likely that of an Egyptian, Phoenician or Greek specialist.

Since all the described specimens of retentive prosthesis follow the Egyptian concept, it would appear that they were the work of Egyptian dentists and not as now described.

Fig. 7.—Greek appliance. Specimen in Archaeological Museum, Athens (Guerini).

Fig. 8.—Roman retentive prosthesis, consisting of a gold splint 3 mm. in height (Sudhoff).

In conclusion, I feel that there is now sufficient evidence, founded on the statements of qualified Egyptologists, to say definitely that dentistry had its origin in Egypt during the Pyramid Age. Phoenicia and Greece later merely copied her methods of prosthesis.

The superiority in design and concept of the dental prosthesis of the Etruscans show that it could not have been created suddenly but must have been the result of many years, even centuries, of evolutionary progress. Who then but the Egyptians could have laid the groundwork?

The dentists of ancient Rome carried the knowledge of the Etruscans a step further and for simple retentive prosthesis used a gold splint of sufficient width to hold the teeth together. Therefore, those specimens now supposedly of Phoenician and Roman origin are, as Guerini hinted, more likely of Egyptian workmanship.—*119 West Fifty-Seventh Street.*

POSTGRADUATE AND RESEARCH TRAINING FOR DENTAL OFFICERS OF THE NAVY

A. G. Lyle,* D.D.S., Washington

THE Chief of the Bureau of Medicine and Surgery of the Navy is very much interested in medical and dental education and in research work, and especially in postgraduate training and education for research. The plan for postgraduate training and education for research work, which is at present in operation, is being greatly expanded as quickly as possible with a view to continuing it in a coordinated manner as far into the future as can be foreseen. Facilities and funds are to be made available to the Dental Division for a very comprehensive postgraduate training and research program in dentistry. The Assistant Chief of Bureau for Dentistry, of the Bureau of Medicine and Surgery, is responsible for the preparation of the plan for organizing, implementing and directing the dental program.

The plan which is to be developed contemplates sending selected dental officers to civilian dental colleges which have established organizations and facilities for giving effective instruction in previously determined subjects. This is in addition to the expansion of postgraduate instruction, education for research and research work, which is now being done at the U. S. Naval Dental School and the U. S. Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md.

Postgraduate Instruction

The plan for postgraduate instruction will recognize two types: (1) Postgraduate instruction in a subject which is immediately useful for practical application in improving the dental service of the Navy. This will be referred to as "postgraduate instruction." (2) Advanced instruction in a subject which is necessary for education for research. This is especially intended for providing further instruction to the dental officer who has the aptitude for research work so that he will be properly qualified to work in the field of dental research. This will be referred to as "education for research."

Research Work

The plan for research work contemplates the following: (1) education of selected dental officers for research work; (2) sponsoring of worthy research projects; (3) requesting the allocation of funds for financing especially selected projects; (4) encouragement and assistance for dental officers, hospital corps officers and enlisted dental technicians who, on their own initiative, engage in work on worthy individual dental research projects throughout the naval service.

Standards for Courses

When considering the civilian dental colleges for participation in this program, careful deliberation will be given to the manner in which available courses of instruction are conducted. The following factors will be evaluated: (1) the level at which instruction is given; (2) qualifications of personnel constituting the teaching staff; (3) composition of the

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course of instruction; (4) manner in which the course is presented; (5) duration of each course; (6) the number of times a course has been given; and (7) the manner in which the essence of each course may be integrated with the policy of the Bureau of Medicine and Surgery for postgraduate instruction, and education for research for dental officers of the Navy.

The level of postgraduate instruction will have to be above that of undergraduate work in teaching quality and in environment. Postgraduate students must not be grouped with senior dental students in classes in any subjects. The level of the subject material of the course must be far above that which is taught for the purpose of qualifying senior students for a degree in dentistry and a license to practice the profession.

The qualifications of the personnel constituting the teaching staff will be appraised for the purpose of determining if the instructors are competent to teach advanced courses. There may be highly respected and capable instructors in dental colleges who are almost indispensable for teaching undergraduate dental students but who would not have the background, the perspective or the advanced knowledge for properly presenting postgraduate instruction.

The composition of the course will be analyzed. It will be expected that it will be composed of material which is advanced and correlated, and that undergraduate work will not be duplicated any more than is absolutely essential for continuity.

The manner of presenting the course will be studied in order to determine the approach to the student, the sequence in which the subject material is introduced, how much of the instruction is didactic, how much is visual and how much is practical.

The duration of the course will be considered for the purpose of determining if the knowledge to be gained by the dental officer will justify the time he will spend in the pursuance and completion of it; in other words, whether or not his qualifications and talents could be utilized to better advantage to himself and the naval service in some other assignment.

It is desirable to know how many times and over how long a period a postgraduate or special course of instruction has been given, in order to appraise its value.

The standards for analyzing the postgraduate courses which may be available at civilian dental schools and colleges have been adopted for the purpose of procuring the very best possible instruction for dental officers of the Navy.

Medico-Dental Science Subjects

From experience, in the process of examining candidates for appointment as commissioned officers in the Dental Corps of the Navy, and in observing dental officers who are postgraduate students at the U. S. Naval Dental School, National Naval Medical Center, it was observed that they are often weak in the medico-dental science subjects, such as pathology, bacteriology, biochemistry, nutrition, hematology, dermatology, syphilology, anesthesia and pharmacology, and in the dental subjects of oral diagnosis, treatment planning, roentgenology, periodontia, maxillofacial surgery and oral surgery. It has also been noted that they are usually very proficient in the practical and mechanical subjects which are required for a high degree of skill in operative dentistry, crown and bridge prosthesis and prosthodontia. In the preparation of the curriculums for the postgraduate courses at the U. S. Naval Dental School, it is the policy to integrate the medico-dental science subjects with all of the courses and with the work of the daily routine, in such a manner as to teach the student the value of applying knowledge of the basic sciences when diagnosing, when planning treat-

ment and procedure, and when estimating the prognosis or degree of success anticipated.

Postgraduate Courses

The experience acquired during the twenty-three years since the U. S. Naval Dental School has been established is now incorporated with the present curriculums for the various postgraduate courses. The postgraduate courses now available to dental officers are: (1) Basic Indoctrinational Course, (2) General Postgraduate Course, (3) Oral Surgery, (4) Prosthodontia, (5) Maxillofacial and Ocular Prosthesis, (6) Periodontia and Oral Pathology and (7) Operative Dentistry.

The Basic Indoctrinational Course is designed for newly commissioned dental officers and is not as comprehensive professionally as the General Postgraduate Course. The General Postgraduate Course is designed to acquaint experienced officers with recent advances and newly developed specialized procedures. The courses in Oral Surgery, Prosthodontia, Maxillofacial and Ocular Prosthesis, Periodontia and Oral Pathology, and Operative Dentistry are specialized. All courses are of six months' duration.

Certain fundamental medico-dental and dental science subjects are included in all of the courses except the Basic Indoctrinational Course. A minimum number of hours is allotted to each course for didactic instruction. This number may be increased in courses in which a subject is of more correlated importance. The number of hours for laboratory and clinic work are allotted in the same manner.

There are 914 clock hours of instruction in each course of six months' duration. The manner in which the allotment of time may vary is shown in the accompanying table.

The following subjects are included in all of the courses:

Allotment of time for courses

Course	Hours of Instruction		
	Didactic	Laboratory	Clinic
General postgraduate	388	65	461
Prosthodontia	388	11	515
Oral surgery	316	81	517

Medico-Dental Sciences: Oral pathology; oral bacteriology; biochemistry and nutrition; hematology; tropical medicine; dermatology and syphilology; anesthesia; pharmacology.

Oral Medicine: Oral diagnosis and treatment planning; roentgenology; periodontia; public health dentistry.

Operative Dentistry: Dental materials, manipulation and research; operative procedures; endodontia.

Oral Surgery: Maxillofacial surgery; exodontia and minor oral surgery.

Prosthesis: Crown and bridge prosthesis; partial dentures; full dentures; ocular prosthesis; maxillofacial prosthesis.

Naval Subjects: Property and accounting; personnel administration; public speaking; dental research; audio-visual training films.

Special Clinics and Assignments: Guest speakers; conferences; research project.

Dental Research

There is a Dental Section in the Research Division of the Bureau of Medicine and Surgery, and a dental facility in the U. S. Naval Medical Research Institute, National Naval Medical Center. Special courses in education for research are given at the U. S. Naval Dental School for the purpose of preparing selected dental officers for research work. The curriculums for these courses are prepared as required, and depend somewhat on the type of research for which the student may have aptitude. However, certain basic subjects are included in these courses in the same manner as for the general or specialized postgraduate courses.

Dental officers and enlisted men are invited to submit proposals for investigation to the Chief of the Research Division of the Bureau of Medicine and Sur-

gery. They are encouraged to develop research projects on their own initiative wherever they may be stationed.

Dental officers are also assigned to other agencies of the government and to civilian institutions for education for research and for research work.

There are at present two dental officers on duty at the U. S. Naval Medical Research Institute, two are ordered to the National Bureau of Standards, one is attached to Naval Medical Research Unit No. 2 in Guam, Marianas Islands, and one is attached to Naval Medical Research Unit No. 3 at Cairo, Egypt. Several dental officers are engaged in individual research projects which they carry on in addition to the usual duties required of them.

At the present time the following dental research is being conducted:

Guam, Marianas Islands: Survey of oral conditions of natives with emphasis on dental caries and soft tissue lesions; color photo records of oral manifestations of general disorders.

Cairo, Egypt: Effectiveness of hot oil sterilization of dental instruments for controlling excessive corrosion caused by desert conditions.

San Juan, Puerto Rico: Effect of unusual habits of eating citrus fruits upon the dental enamel of natives.

Pearl Harbor, Territory of Hawaii: Study of dental caries involving personnel at sugar plantations.

U.S.S. Iowa: Increase of dental caries over a one-year period in the same persons.

U. S. Naval Dental School: Studies on dental amalgam; oral bacteriology; oral pathology (through recently established archives of oral pathology); preventive dentistry; hand and eye prosthesis.

Dental Facility, U. S. Naval Medical Research Institute: Effect of oxalates in a caries-producing diet, on the teeth of white and cotton rats; factors involved in dental calculus formation; improved recording methods for better identification of dead bodies by means of the teeth; embedding procedure for sectioning combined hard and soft tissues without decalcification; hardness studies on human teeth; applicators for oral refrigeration anesthesia and development of a practical apparatus; dental research methods and dental statistics accounting.

Other Governmental Activities

Dental officers of the Navy are also assigned to other governmental activities for special courses of instruction in subjects other than dental for the purpose of training them to assume liaison and staff duties with other branches of the Navy, the Marine Corps and the Army. One is presently being ordered to such instruction at the Industrial College of the Armed Forces in Washington and another one is to be assigned to the Armed Forces Staff College, Norfolk, Va.

Lecturers and Consultants

Civilian lecturers and consultants are now being invited to present lectures and demonstrations in special subjects to the students and staff at the U. S. Naval Dental School. They are remunerated for their work.

Future Policy

It is the policy of the Chief of the Bureau of Medicine and Surgery to develop and expand the medical and dental postgraduate instruction, education for research and research work programs, to the maximum degree of efficiency and value to the naval service, and to extend them as far as possible into the future, for the purpose of keeping abreast of the advancements in dental education and practice, and, if possible, to contribute something to the profession which may be original. In doing so, advice and assistance will be sought from civilian sources as well as from other governmental agencies and the military services. —*Potomac Annex.*

PERIODONTIA AND THE GENERAL PRACTITIONER

Raoul H. Blanquie,* D.D.S., F.A.C.D., San Francisco

DENTISTS, in their professional duties, are confronted with two basic problems: the care and preservation of the teeth and maintenance of their investing and supporting tissues in a state of health. Notwithstanding these recognized responsibilities, dental education still concerns itself, for the most part, with the repairing of lost tooth substance and the replacement of missing members of the dental arches. Diseases of the periodontium together with their correction receive but scant attention in the curriculum of most of our dental colleges. As a result, dental graduates are sent into practice with a very limited knowledge and appreciation of a vastly important part of dentistry.

With such a background it cannot be considered strange that some members of our profession disregard pathologic conditions of the investing and supporting tissues of the teeth. This attitude toward periodontal diseases leads to the often-heard complaint, from patients suffering with these ailments, that they were never warned or advised by their dentists whom they visited regularly. When they learn the truth, they not only lose confidence in a particular dentist but their belief in dentistry has been impaired.

An erroneous idea also prevails that very little of a practical nature can be done to correct periodontoclasia. The fact that the complete cause of this oral pathologic manifestation is still unknown cannot be advanced as a valid excuse for neglecting the condition. Equally logically we should display unconcern regarding carious teeth for the reason that the causes of caries are still in the realm of theory. With the existing knowledge of the factors that contribute to pathologic conditions of the periodontium, as well as modern methods for the treatment of their symptoms, much can be accomplished towards arresting the course of the disease and restoring the periodontium to health and normal function.

The Qualified Periodontist

A debatable viewpoint exists that periodontia is a specialty within the framework of our profession and does not belong in the field of general dentistry. I concur with Arthur Merritt[1] who stated that ". . . if periodontia is to be successfully practiced, it must comprehend the whole range of dental practice; orthodontia for the establishment of normal occlusion; operative dentistry for the correction of abnormalities in tooth form; prosthodontia for the replacement of lost teeth without which physiologic function is impossible; and, lastly, exodontia for the removal of hopelessly diseased teeth." The treatment for the correction of local mechanical factors, among the causes of periodontal disorders, necessitates the application of the highest ideals in most of the branches of dentistry. The one best qualified to carry out all these requirements is the general practitioner.

Read at the annual meeting of the California State Dental Association, San Francisco, May 1, 1946.

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1. Merritt, Arthur, *Periodontal Diseases*. New York: The Macmillan Co., Third Edition, 1945, p. 6.

From the mechanical standpoint we should be interested in ensuring the maximum retention of the teeth upon which we spend so much time and effort in making restorations. It should be our goal also to keep pulps vital and to ensure that the teeth remain in healthy sockets during the life span of every patient. No matter how perfect the margins of our restorations may be, the future of any tooth is dependent to a large extent upon the degree of integrity of its alveolar support and the health of its investing tissues. A diseased periodontium, from a purely mechanical standpoint, means the ultimate loss of the tooth that it supports, if the disease is not checked in time. Probably more teeth are lost as the result of periodontal disturbances than from any other cause. The fact that dentistry has progressed in its mechanical development to the stage where modern technics permit the making of satisfactory artificial dentures should not make us indifferent to the loss of teeth that could have been saved through proper treatment.

Dangers of Periodontal Infection

Dentistry at its beginning was almost entirely mechanical in nature. In its broad development from the status of a trade to its present position as a profession, dentistry has emerged as a recognized branch of the healing arts and this recognition imposes upon it a very definite responsibility. Scientific findings together with clinical observations have conclusively proved that infections arising in the dental organs and their appendages are capable, through metastatic processes, of producing pathogenic changes in other parts of the body. They can also become the source of general systemic infections. The idea of dental infections usually connotes pulpless teeth and periapical involvement, so that degenerative changes within the periodontium are given very little consideration. Yet the fact remains that the prevalence of periodontal diseases, with their extensive areas of infected tissues, makes these pathologic conditions the principal and most common oral menace to general health. Each time that we see bleeding gingivae, we should be warned that a breakdown exists in the defense barrier between the bacteria of the oral cavity and the blood vessels underlying the investing epithelium. We should bear in mind that periodontal diseases cannot be considered potential foci of infection in their last stages alone, when the teeth are so loose that they can be removed with the fingers. From their very beginning, during initial gingival inflammation, periodontal diseases are capable of disseminating infection throughout the circulatory system. From their incipient stages to their terminal point, usually extending over a period of many years, there is a constant absorption of toxins and migration of bacteria into the circulatory channels from the pockets, which provide the ideal media for bacterial incubation. Many pathologists have demonstrated the presence of Streptococci in every case of periodontoclasia. This same organism has been found within the tissues and in proximity to lymph channels. We should be apprehensive of ingestion of exudates from the pockets. The end product of periodontoclasia is the loss of the teeth, in itself a serious matter, but in reality secondary in importance to the relation of this disease to general health. Laboratory deductions regarding systemic reactions resulting from periodontal diseases are supported by clinical findings of dentists who practice periodontia. It is not uncommon for patients suffering from some constitutional ailment to find their symptoms alleviated or completely relieved following periodontal treatment. There are others who obtain relief or elimination of obscure symptoms and experience a feeling of physical well-being.

Many physicians are conscious of the

dangers inherent in periodontal infections; but, lacking knowledge of the proper extent of treatment, they often prescribe the removal of all teeth. Their recommendations may be correct but there are times when they order the extraction of teeth that could be saved by proper treatment. I believe that we should cooperate fully with physicians in the treatment of our patients but I do not think that they should have the final word in decisions regarding dental problems. On the other hand, dentists should be cognizant of and alert to possible sequelae of all oral diseases and base their prognosis on whether infection can be totally eliminated without sacrificing the teeth.

The general practitioner has the privilege of observing periodontal disorders in their incipiency, whether the starting point be located in the gingivae or in the crests of the alveolar process. Inflammation and bleeding in the soft tissues and a slight decalcification or breakdown in the bone are the initial visible indications warning us that pathologic changes have started in the periodontium. It should be routine practice for every dentist to examine the soft tissues and their underlying structures in the mouth of all patients, both adolescents and adults. Full mouth roentgenograms, with correct angulation, are a necessary adjunct to this examination. It will be found that the majority of our patients are in need of some form of prophylaxis or periodontal treatment.

Proper Prophylaxis

Prophylaxis should not imply merely the ordinary cleaning of the crowns of the teeth. It should first of all include adequate instruction to the patient in the proper care of the mouth and the correct use of a properly designed toothbrush with an acceptable dentifrice. Too often patients obtain their only knowledge of oral hygiene from some radio announcement. Clinically, prophylactic treatment should consist of the careful and thorough removal of all irritating elements contained within the subgingival space which, if undisturbed, will ultimately produce a breakdown of the epithelial lining of the crevicular surface with subsequent inflammation and infection. The scaling process can be accomplished with sharp spoon-shaped scalers of the Younger type. This should be followed by porte-polishing of the scaled areas with an orangewood point and the use of a suitable polishing agent. The interproximal surfaces can be adequately polished with unwaxed tape and the polishing agent. The purpose of this polishing is to render the subgingival space as smooth as possible and minimize the adhesion of calculus. The final step is the cleansing and polishing of the crowns with a rubber cup, if there are no stains, and with a brush if stains are present. I do not believe that pumice is the most suitable cleansing agent. There are others that will be found more effective and less injurious to dental structures. This prophylactic operation should be repeated about every six months. A case of ordinary gingivitis, uncomplicated by systemic factors, will usually respond satisfactorily to such treatment.

Causes of Gingivitis

Another form of gingivitis which is not uncommon is the type that is caused by a so-called referred injury. The cause of this gingival disturbance is abnormal occlusal stress which causes the blood vessels in the periodontal membrane to be wedged between the cementum and the alveolar bone, resulting in a stasis in the gingivae. This condition may be corrected by careful spot grinding of the offending surfaces of the teeth to relieve the lateral pressure.

A vitamin C deficiency also may bring about a gingival inflammation by producing a permeability of the walls of the capillaries in the gingivae which permits the extravasation of blood into the surround-

ing tissues. Prescribing the proper amount of vitamin C should relieve this type of gingivitis.

Gingivitis may originate also from sources outside of the oral cavity and may reflect systemic disorders such as tuberculosis, diabetes, scurvy, syphilis and other ailments. It may result also from pregnancy.

When the dentist finds a form of gingival inflammation that resists all modes of local and vitamin therapy, it is advisable to solicit the cooperation of the family physician and obtain a physical history of the patient. I have thus discovered cases of diabetes and syphilis that were unknown to both patient and physician.

Treatment of Incipient Periodontitis

Medication will be found of invaluable assistance in incipient periodontal cases as well as in advanced ones where it is used as a preoperative measure. The purpose of this expedient is to introduce into the gingival crevice or periodontal pocket, and force into adjoining soft tissues, a suitable antiseptic agent capable of reducing bacterial activity. This procedure is carried out with a rubber cup mounted on a handle. The medicament may be one of the various dyes such as 5 per cent mercurochrome solution into which can be incorporated equal parts of sodium perborate, sodium chloride and sodium bicarbonate to make a thin paste. A spray containing equal parts of hydrogen peroxide and very warm water to which are added any flavoring agent and a few drops of tincture of green soap may first be used to remove detritus and saliva from around the necks of the teeth. The mouth is blocked off with cotton rolls and a saliva ejector is inserted, after which the tissues are dried with warm air. The medicament is picked up with the cup which is placed under the free margin of the gingiva. By means of a pumping action the solution is forced into the underlying space and tissues as advanced by Vastine.[2] Better results are obtained if the medication is permitted to remain undisturbed for a few minutes. It may be necessary to repeat the procedure at subsequent sittings to obtain the desired results. If inflammation and suppuration are present it is advisable not to exert too much pressure or the infection may be forced deeper into the tissues.

Treatment of Advanced Periodontitis

When periodontal disturbances have progressed beyond their incipient stages, leading to the detachment of the fibers in the pericementum and resulting in the formation of a pocket, we are confronted with a problem requiring different therapeutic consideration. The consensus among periodontists is that the objective of periodontal treatment is the elimination of the pocket with its attending infective processes and the arrest of further degenerative changes within the periodontium. The principle of treatment required to attain that objective has been the subject of much controversy in the past and there are still some dissenting opinions to be found. It has been contended by some that after thorough scaling of a periodontal pocket a reattachment would take place between the soft tissues and the surface of the exposed cementum. This would comprise an ideal result if biologic forces could react to bring about such an effect, but unfortunately this conception is not based upon scientific facts. Dental histopathologists are agreed upon the premise that primary cementum, remaining denuded for a period of time in the presence of suppuration, becomes a dead, inert tissue incapable of regeneration except through the medium of cementoblasts lodged in the periodontal membrane. It so happens that when a pocket is formed, through the detachment of periodontal fibers, the other elements of the membrane also disappear. If a pocket should reach the

2. Vastine, A. D., Research in Subgingival Therapy. *J.A.D.A.* 17:307 (March) 1930.

proximity of the apical third of the root, which is usually covered by secondary cementum, there is the possibility that new cementum may be laid down by the cementoblasts contained within that tissue. On the opposite side of the pocket it will be found that epithelium regenerates so rapidly that it walls off the underlying connective tissue fibers and prevents their insertion into the approximating cementum, in the event that that tissue has regenerated and is ready to receive them.

If a pocket does not close after its tissues are reattached, it remains as an aggravating factor in the further development of the pocket. While it is true that, after thorough scaling of a pocket, inflammation and infection will subside, these results are but short lived. This is primarily a result of the fact that failure of the pocket to close through reattachment permits irritating elements to reenter the detached area and eventually to re-establish inflammatory changes leading to reinfection. If periodontal localization of infections could be maintained without incurring the danger of systemic reaction, instrumentation or scaling alone might be justifiable for correction of these oral lesions. We are faced with the incontestable fact that all periodontal diseases must be considered as either potential or active foci of infection. Furthermore, we lack any positive index enabling us to judge if an oral infection is related or not to any systemic disturbance. In the absence of any such diagnostic means we are in no position to gamble on the possible outcome of oral infections with such serious potentialities as periodontal diseases.

Alternative Treatment

If scaling fails to attain the desired objective, our only alternative is the complete elimination of the pocket itself. This is not a radical measure but a most rational procedure. Many years' experience has shown that lasting and beneficial results have followed elimination of pockets in cases where conditions justified such treatment. The principle of removing the loose detached tissues that form the periodontal pocket is not a contemporary one but dates back several centuries. Its refinements and various methods of application are modern and at the present time we have a choice of several procedures, all of which embody the same basic principle. We must bear in mind that we cannot expect any method to perform miracles and that for hopeless conditions that are too far advanced, or if unfavorable factors are beyond control, the forceps remains the only practical solution. If a favorable prognosis is based upon a careful examination of the progress of the symptoms and of the known etiologic factors, we may anticipate satisfactory results.

Choice of Methods

We may treat a case by pocket elimination, operative procedure, chemotherapy, electric surgery and electric coagulation. To say which method is preferable would be very difficult because identical results may be obtained with all procedures. It would be like trying to decide upon the best mode of travel: automobile, train or plane. They will all take you to your destination; yet one may present some advantage over the other. So it is with the various methods of periodontal treatment. Some prefer the surgical approach because the scalpel permits accurate and clean-cut incisions; others select the electric methods because they eliminate excessive bleeding, and some choose the chemical technics which require no anesthetic. The point to bear in mind is that the proper application of any method permits the complete eradication of periodontal pockets and the restoration of the periodontium to a state of health.

Besides having a comprehensive knowledge of the technic of any particular procedure employed, it is advisable to be

familiar with the fundamentals of both histology and histopathology of the periodontium. This will prove invaluable if we desire to have a clear understanding of what we are trying to accomplish in the correction of these diseases.

The removal of the soft tissues, constituting the periodontal pocket, to the level of healthy structures permits the growth of a new epithelial covering for the remaining alveolar process. This new tissue, delicate in the beginning, soon becomes firm and resistant under proper stimulation. The new gingival crevice that is formed is usually very shallow. This is a strong deterrent against reinfection.

The use of a surgical dressing or packing is absolutely indicated in all methods involving the elimination of the pocket. This is necessary to overcome postoperative discomfort, protect the regenerating tissue, desensitize the exposed cementum and prevent the new tissue from resuming its former height. The use and proper application of the packing is an important factor in the final results of any case.

The eradication of periodontal pockets by any of the aforementioned technics implies only the removal of the symptoms of periodontoclasia. This may be compared with the thorough cleaning out of disintegrated dentin from a cavity in order to remedy the condition of caries and has no bearing upon the correction of its etiologic factors. If the complete cause of periodontoclasia were known it would still be necessary to eliminate the symptoms, for these would not correct themselves any more than carious dentin disappears automatically to be restored by sound tissue.

Mechanical Contributing Factors

A serious consideration must be given to all known etiologic factors if we expect to obtain maximum results in the treatment of periodontal cases. It may not be possible to remove or correct them completely but alleviation of their effects should be attemped. Our present knowledge of the cause of periodontitis should make us realize that it consists of more than one factor and that it is complex in nature. The contributing factors are divided into those of local and systemic origin. Probably all of the local factors have been revealed and are mainly mechanical in character. One of the most common in this category is abnormal stress caused by unfavorable relations of the teeth with one another or with their antagonists. Such conditions exist in practically every mouth but when they are associated with improperly calcified osseous structure surrounding the teeth, alveolar disintegration usually follows. A great deal has been heard about altering the bite by grinding natural teeth in order to restore proper occlusion. We should not believe that normal relationships can be brought about by any such procedure. It is true, however, that it is possible to relieve undue pressure or stress on certain teeth by the careful reshaping of interfering surfaces, using very small mounted stones on occlusal surfaces and carborundum discs on incisal borders. Loose teeth do not always indicate loss of alveolar support. Abnormal stress may produce hyperemia in the periodontal membrane, causing its fibers to distend and force the tooth to extrude from its socket accompanied by a certain degree of looseness.

Some patients suffer from bruxism (grinding of the teeth during sleep). Protrusive and lateral movements of the mandible may go beyond their normal range, during slumber, and the jaws are closed with much greater than average force. During these various mandibular excursions, certain teeth receive the brunt of impact. The corresponding effect upon the alveolar bone may result in its breakdown. Psychiatry has often been successful in the correction of this harmful habit. A practical dental remedy is a rubber splint, such as is used by boxers, to be worn by the patient at night.

Improperly shaped clasps and imping-

ing borders of partial dentures upon the gingivae will often bring about inflammatory conditions which may terminate in pocket formation. The lingual margin of partial dentures should not rest upon the gingivae because it will arrest the circulation. Faulty contact points and improper contouring of restorations will produce incorrect deflection of food from the gingivae and permit it to remain and pack against the soft tissues.

Oral Hygiene

Mouth hygiene probably is brought to the attention of patients more forcibly by manufacturers of toothbrushes and dentifrices than by dentists. Very few members of our profession take the time to advise their patients in the adequate care of the mouth. The incorrect use of the toothbrush, which often is of wrong design, can cause much harm to both the teeth and the soft tissues. Instruction in the proper use of a correctly designed toothbrush and a suitable dentifrice is a service that should be rendered every patient and for which the dentist should be compensated on the basis of time expended and service rendered. There are many accepted modes of toothbrushing and it is a matter of judgment which may be the one suitable for a particular case. It usually takes time and a great deal of patience to instruct a patient properly in oral hygiene but the results are well worth the effort. Adjuncts such as balsam wood toothpicks, rubber interproximal points and elastic bands, instead of dental floss, are of prime importance in keeping the interproximal tissues in good health.

Systemic Contributing Factors

Our knowledge of the fundamental systemic causes of periodontoclasia is incomplete. We have evidence that early breakdown of the alveolar structure is frequently associated with endocrine disturbances, mainly of the thyroid and parathyroid glands which affect calcium and phosphorus metabolism. A basal metabolism test and a blood serum analysis will often indicate a relationship between these two disorders.

Diseases such as diabetes, scurvy, syphilis and tuberculosis may have a marked influence on inflammatory changes within the gingivae. The most apparent effect of such disease upon the gingivae is a lowering of their resistance which makes them more susceptible to inflammation and infection. The periodontal symptoms, when related to or at least aggravated by these systemic conditions, do not generally respond to treatment until the constitutional factors have been brought under control.

Diet and nutrition unquestionably play a definite role in the susceptibility to and progress of periodontal disturbances. Improper diet results in the lack of necessary vitamins and minerals which are required in order to maintain a health balance in all parts of the body. The gingivae, perhaps to a greater degree than most tissues elsewhere in the body, owing to their bacterial environment, are subject to inflammatory changes. Subsequent infection is possible whenever any change in gingival defense mechanism is brought about by dietary deficiencies. Many dentists have made a special study of diet and nutrition and are qualified to advise and guide their patients in this important subject.

The treatment of all etiologic factors of systemic origin, aside from dietary problems, requires competent medical advice and management. Physical checkups, laboratory interpretations, the correction of any constitutional ailments and calcium therapy distinctly belong in the province of the physician.

Determining the Prognosis

The successful management of periodontal diseases, besides the treatment of their symptoms and etiologic factors, should include the careful selection of those patients whose prognosis can be de-

termined as favorable. Many mouths that come to our attention will be found to have passed the limits of possible treatment. Favorable prognosis should imply the reasonable assurance that a sufficient number of teeth can safely be retained for a period of not less than five years. If we are able to return teeth and their supporting structures to a state of health and function for at least that length of time, I believe we are fully justified in attempting treatment.

To endeavor to treat hopeless teeth is not only futile but places the health of the patient in jeopardy. There are many diagnostic conditions that should guide us in our judgment regarding prognosis. Usually, about 50 per cent of the alveolar bone should remain around the roots of the teeth. This amount may be subject to variation depending upon other existing conditions. If the osseous structure is of sound calcification, principally in the region of single rooted teeth, we may be able to overcome a somewhat more advanced degree of resorption.

Among the unfavorable factors, which usually result in the loss of the teeth involved, are the following not uncommon conditions: teeth that can be depressed within their sockets; molars, especially in the upper arch, whose bifurcations are involved; pockets closely approximating the floor of the maxillary sinuses; vertical atrophies with fanning anterior teeth; irregularly shaped pockets of varying depths; unfavorable occlusal relations that cannot be corrected; poorly calcified bone; teeth with large crowns and short roots and patients who lack the willingness or ability to practice adequate mouth hygiene.

In certain borderline cases it will be found both practical and expedient to extract all of the upper teeth and save as many of the lower ones as possible. This reduces the occlusal force on the lower teeth and enhances their longevity.

Summary

1. The principal reason for the generally prevalent neglect of periodontal diseases is the failure of dental education to evaluate justly the importance of periodontia.

2. Periodontia, with its dependence upon and affiliation with almost every branch of dental practice, rightfully belongs in the field of general dentistry.

3. Although ultimate loss of the teeth inevitably results from periodontoclasia, the predominant importance of this oral infection is its potentiality for initiating or aggravating constitutional disorders.

4. Our greatest opportunity for the permanent correction of periodontal disturbances lies in their early diagnosis and treatment.

5. We have at our command, for the thorough elimination of periodontal pockets or lesions, the choice of several methods capable of accomplishing the desired objective.

6. Besides the treatment of the symptoms we must endeavor to correct all the known local and systemic etiologic factors.

7. We are justified in instituting periodontal treatment whenever we feel assured that infection can be eliminated and that the safe retention of the teeth can be prolonged for a reasonable length of time.

8. Suitable postoperative checkups at regular intervals are necessary to the proper maintenance of all cases that have been treated.—*1172 Flood Building.*

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HAROLD HILLENBRAND, D.D.S., *Editor*

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EDITORIALS

ANNUAL DUES FOR 1947

THE Bylaws of the American Dental Association require the payment of dues on January 1 for the ensuing year. Sixty days after that date, all members who have not made their annual payments are dropped automatically from the rolls and lose the privileges of membership which include subscription to THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION. The final date for payment of 1947 dues, therefore, is March 1. After that, reinstatement must be secured by complying with the provisions of the state dental society.

No dentist who recognizes the common problems that face him and the profession will debate very long the value of membership in local, state and national dental organizations. The appreciation of this fact has been demonstrated by the steady increase in membership for the past decade and more. At the end of 1946, 62,281 dentists and 1,505 dental students had membership in the American Dental Association to make a total of 63,786. No other profession in the country can boast of having such a large part of those eligible for membership enrolled in the national organization.

In many states, one of the penalties of nonpayment of dues is the forfeiture of the privilege of life membership, which requires continuity of membership for a certain period of years. When these requirements of the state dental society have been fulfilled and when the state society has elected a member to life membership in its own organization, the member is then eligible for life membership in the American Dental Association on election by the House of Delegates. Life members in the American Dental Association must be at least 65 years of age and must have paid annual dues for at least twenty-five years. When a member is elected to life membership, he is no longer required to pay annual dues.

No member can afford, through neglect or carelessness, to forfeit his membership for nonpayment of dues. Members are urged to mail their check at once to the secretary of the local society in order to maintain their good standing.

IMPORTANT CONFERENCES TO MARK FEBRUARY MIDWINTER MEETING

MANY important conferences will be held in conjunction with the annual meeting of the Board of Trustees of the American Dental Association, in Chicago, February 6, 7 and 9. Plans for the annual meeting of the Association in Boston, August 1947, will be made, and other important problems confronting dentistry will be discussed at special conferences.

The third annual Congress on Dental Education and Licensure, the first to be held since the start of the war, will convene in the Stevens Hotel on Saturday, February 8, for an all-day program. Representatives of the American Dental Association, the American Association of Dental Schools and the American Association of Dental Examiners will take part in the program, which will be devoted to problems of dental education, licensure, aptitude testing, specialties and auxiliary agencies in dental practice.

A Conference on Dental Services for Children will be held at the Stevens Hotel on Sunday, February 9. The Conference is sponsored jointly by the Council on Dental Health of the American Dental Association and the American Society of Dentistry for Children. The Conference will examine the problem of expanding services for children and develop recommendations for an intensive study of this important problem.

An open hearing on the proposed revision of the Constitutional and Administrative Bylaws of the American Dental Association will be held at 1:30 p.m. on Sunday, February 9, at the Stevens Hotel. The hearing will provide an opportunity for the expression of opinions on all phases of the proposed new articles in advance of final action by the House of Delegates at the annual meeting in Boston. The hearing is sponsored by the Committee on Constitutional and Administrative Bylaws.

The Conference of Dental Editors, which is to be organized within the framework of the American Dental Association, will hold its first meeting on Tuesday, February 11, at the Blackstone Hotel. The purpose of this meeting is to develop a program for the establishment of a permanent Conference of Dental Editors devoted to studying, and making recommendations on, the problems of dental journalism. The first meeting will include discussions by representatives of the American Dental Association and the American Association of Dental Editors.

A Conference of Section Officers of the American Dental Association will be held on Wednesday, February 12, in the Central Office of the Association. Plans will be made for the development of the scientific program for the annual meeting in Boston.

These conferences indicate the continuous study which is being given to important dental problems by various agencies of the profession. All dentists who are interested in certain of these meetings should make early arrangements to attend.

A. D. A. AFFAIRS

BOARD OF TRUSTEES TO MEET FEBRUARY 6 IN CHICAGO

The Board of Trustees of the American Dental Association will meet February 6-7 and 9 in Chicago. The meeting will be adjourned February 8 to permit members of the Board to attend the third Congress on Dental Education and Licensure, conducted by the Council on Dental Education, which will be held in the Stevens Hotel in Chicago.

The Board is expected to complete plans for the eighty-eighth annual meeting of the American Dental Association, to be held August 4-8 in Boston.

Members of the Board are: J. B. Carr, Indianapolis; C. S. Foster, Cedar Rapids, Iowa; Robert P. Thomas, Louisville, Ky.; Henry Hicks, Greenwich, Conn.; William McGill Burns, Brooklyn, N. Y.; Willard Ogle, Dallas, Texas; Fred S. Shandley, Seattle, Wash.; R. C. Dalgleish, Salt Lake City; LeRoy M. Ennis, Philadelphia; Harold W. Oppice, Chicago; C. J. Wright, Lansing, Mich.; Edward J. Jennings, Trenton, N. J.; and Clyde E. Minges, Rocky Mount, N. C.

COMMITTEE TO HOLD HEARING ON REVISED CONSTITUTION

The Committee on Constitutional and Administrative Bylaws of the American Dental Association will hold an open hearing February 9 at 1:30 p.m. in Room 20, fourth floor, Stevens Hotel, Chicago.

The meeting, which will be conducted by Percy T. Phillips, New York, chairman of the committee, will be devoted to preliminary hearings on the proposed revision of the Constitution and Bylaws. The text of the revision was printed in full in the January 1 issue of THE JOURNAL.

All officers of state societies and others interested in the hearings are invited to attend. Members of the committee, in addition to Dr. Phillips, are Max E. Ernst, St. Paul, Minn., and C. E. Peterson, Rockville, Conn.

TESTIMONIAL DINNER HELD IN HONOR OF DR. HARRY B. PINNEY

Harry B. Pinney, retired general secretary of the American Dental Association, was guest of honor at a testimonial dinner held in his behalf December 12 at the Chicago Athletic Club by friends and members of the Chicago Dental Society.

After a good fellowship hour and dinner, speakers were introduced by Robert I. Humphrey, president of the Chicago Dental Society and toastmaster for the event. Speakers were Harold W. Oppice, trustee of the American Dental Association from the eighth district; Robert W. McNulty, dean of the Chicago College of Dental Surgery, Loyola University; and Mr. Thomas McMahon, vice-president of Thomas J. Dee and Co.

Dr. Pinney was presented with a chairside radio as a farewell gift.

COMPOSITORS' STRIKE THREAT SETTLED BY WAGE AGREEMENT

The long-threatened compositors' strike which would have forced suspension of publication by THE JOURNAL has been prevented as agreement on wage schedules has been reached by Chicago commercial printing firms and the Chicago local of the International Typographical Union.

THE JOURNAL was forced to cease publication temporarily in 1945 during a compositors' strike in Chicago.

Photo by Howard A. Hartman

Dr. Mead Honored

Sterling V. Mead, left, president of the American Dental Association, receives a certificate of honorary membership in the Mexican Dental Society from Enrique C. Aguilar, secretary of the Mexican society. The presentation was made at the American Dental Association's Miami meeting

DENTAL EDITORS' CONFERENCE WILL BE HELD FEBRUARY 11

A Conference of Dental Editors, authorized at the Miami meeting of the American Dental Association, will be held February 11 in the French and English Rooms of the Blackstone Hotel in Chicago, according to Harold Hillenbrand, editor of THE JOURNAL.

A complimentary luncheon will be given to the guests by the American Dental Association. This new organization within the framework of the American Dental Association will parallel the State Officers' Conference in program and activities.

Members of the American Association of Dental Editors are particularly invited to the conference, as well as those who are eligible for membership in the association. All state and component societies which have publications should send an editor or representative to the meeting. The conference will also be open to business managers and editorial assistants of such publications.

The meeting will be devoted to a discussion of present problems and standards in dental journalism. At an afternoon session, organization committees will be appointed to study problems of membership, structure, advertising standards, the use of reprints and cooperative advertising projects.

THIRD DENTAL EDUCATION CONGRESS TO BE FEBRUARY 8

The Council on Dental Education of the American Dental Association will present the third Congress on Dental Education and Licensure February 8 at the Stevens Hotel in Chicago.

Harlan H. Horner, secretary of the Council on Dental Education, will speak on the topic, "National Qualifying Examinations in the Professions," and Gordon L. Teall, secretary of the National Board of Dental Examiners, will open the discussion.

Howard C. Miller, president of the American Board of Oral Surgery, will open a discussion on "The Future of the Specialties in Dentistry." The topic "Auxiliary Agencies in Dental Practice" will be discussed by Walter H. Wright, dean of the College of Dentistry, New York University; Carl O. Boucher, professor of prosthetic dentistry, Ohio State University, and secretary of the Committee on Prosthetic Dental Service, American Dental Association; Frances Agnes Stoll, chairman of the Committee on Education of the American Dental Hygienists' Association; and Katie McConnell, chairman of the Certification Committee of the American Dental Hygienists' Association. The discussion will be opened by Philip E. Blackerby, dental director, W. K. Kellogg Foundation.

The committee for the third Congress consists of Robert W. McNulty, chair-

man, dean of the Chicago College of Dental Surgery, Loyola University, Chicago; Wendell D. Postle, dean, College of Dentistry, Ohio State University; and Robert P. Thomas, secretary, American Association of Dental Examiners, Louisville, Ky.

CHRISTMAS SEAL CAMPAIGN RESULTS STILL INCOMPLETE

Incomplete receipts from the annual sale of Christmas Seals for the Relief Fund of the American Dental Association reached $14,611 December 31, with returns coming in so rapidly that they could not be counted immediately.

The campaign will continue throughout February this year in order to raise the total contributions to the high level needed for the many dentists released from the armed forces in 1946. The returns were $28,344 in 1945 and $32,167 in 1944 on the same date.

Returns may be made in the envelope accompanying the seals to the Relief Fund, American Dental Association, 222 East Superior St., Chicago 11.

COMMITTEE INVITES HEALTH, SCIENTIFIC EXHIBITS IN 1947

The Scientific and Health Exhibits Committee of the American Dental Association has issued a general invitation to dentists and to dental and other scientific organizations to present exhibits at the 1947 annual meeting in Boston August 4-8.

As this convention will be the first full-scale scientific meeting held by the American Dental Association since 1941, the committee anticipates a large number of new and interesting exhibits.

Exhibits are to be entered under three classes. Exhibits in Class A consist of presentations of individual and original investigations. These exhibits will be judged on the basis of originality and excellence of presentation.

Exhibits in Class B, which do not necessarily represent original research or scientific study, must display originality in the correlation of facts or improvement of technics which will aid the practitioner. The exhibits are judged on the basis of their value to the profession and on the excellence of presentation.

Exhibits in Class C consist of health educational projects. They are judged upon their subject matter and excellence of presentation.

A certificate of award is presented by the American Dental Association to each of the winners of first, second and third place in each class.

DENTAL SOCIETIES

PHILADELPHIA MEETING WILL OPEN FEBRUARY 5

The Greater Philadelphia Annual Meeting, conducted by the Philadelphia County Dental Society, will open its sessions February 5 with the presentation of twenty-three registered clinics.

The meeting will be held February 5-7 in the Bellevue-Stratford Hotel, Philadelphia, under the chairmanship of E. Howell Smith. Abram Cohen heads the steering committee for the meeting.

Among the speakers at the general session will be Gabriel Tucker, professor of bronchology, esophagology and laryngeal surgery, Graduate School of Medicine, University of Pennsylvania, and Frederick A. Bothe, surgeon, Presbyterian Hospital and Jeanes Hospital, Philadelphia.

A topic discussion on children's dentistry will be conducted by Ernest F. Ritsert, Philadelphia. H. Vernon Lapp, Elkins Park, Pa.; J. Horace Githens, Philadelphia; Raymond Werther, Philadelphia; and George W. Thompson, Philadelphia, will take part in the discussion.

Robert R. Gillis, Hammond, Ind., will be one of the members participating in a topic discussion on prosthesis conducted by Sumner X. Pallardy, Philadelphia. Others on the agenda are Vincent R. Trapozzano, Philadelphia, Dr. Smith, and M. M. DeVan, Philadelphia.

In addition to the registered clinics, there will be six topic discussions, forty table clinics, three films on various phases of dentistry and a number of symposiums.

MINNESOTA STATE MEETING TO BE HELD FEBRUARY 24-26

The 1947 annual meeting of the Minnesota State Dental Association will be held February 24-26 in Minneapolis, according to L. M. Cruttenden, secretary.

Among the speakers at the meeting will be George Paffenbarger, Washington, D. C.; William J. Simon, Minneapolis; Isaac Schour, Chicago; and Walter C. McBride, Detroit. A town hall meeting conducted by Edward J. Ryan, Evanston, Ill., will be held on the subject: "What Procedure Do You Follow in Securing an Impression for a Full Lower Denture?"

The meeting will feature 150 table clinics held on two separate afternoons.

HAROLD STASSEN TO SPEAK AT CHICAGO MIDWINTER MEETING

Harold E. Stassen, former governor of Minnesota, will speak on "Freedom in the Years to Come" at 8:30 p.m. February 10 in the Grand Ballroom of the Stevens Hotel as the chief speaker at the general session of the midwinter meeting of the Chicago Dental Society, to be held February 10-13.

Approximately thirty limited attendance clinics will be held at the meeting, and most of the clinicians will offer their material four times, twice on each of two different afternoons. The clinics will be held from 1:30 p.m. to 3 p.m. and from 3:30 p.m. to 5 p.m. on February 10-12.

A good fellowship dinner will be held February 12 in the Grand Ballroom of the Stevens Hotel. An all-star variety show will be staged for the guests after the dinner. Tickets for the entertainment will be on sale at the meeting.

Arthur E. Smith, Los Angeles, will show colored motion pictures February 11 and 12 on oral surgery and facial reconstruction. Dr. Smith will explain the pictures as they are shown.

The program at the meeting will include the largest commercial exhibit to appear at any meeting in the United States, forty-eight essay programs, thirty limited attendance clinics, forty-five question and answer periods, seventy-five table clinics and a series of health, educational and scientific exhibits. The officer in charge of each exhibit will give a talk explaining the material.

WOMEN DENTISTS OF CHICAGO TO HOLD DINNER FEBRUARY 11

The twenty-fifth anniversary dinner of the Chicago Club of Women Dentists will be held at the Blackstone Hotel February 11 during the midwinter meeting of the Chicago Dental Society, so that women dentists attending the meeting may become better acquainted.

The club was founded in 1921 in order to bring the women dentists of Chicago into closer touch. The members are all actively engaged in the practice of dentistry. The club also has a nonresident membership.

Lila M. Frink is president of the club, Winifred Conley is vice-president and Dora Hendrickson is secretary-treasurer.

PENNSYLVANIA DENTAL BOARD WILL MEET FEBRUARY 17-22

The Pennsylvania State Board of Dental Examiners will meet February 17-22 in Philadelphia, according to R. E. V. Miller, Easton, secretary.

The written dental examinations will be conducted February 17-19 and the written hygienists' examinations February 18-19. Clinical dental tests will be held February 20-22, while clinical hygienists' examinations will be on February 20.

ACADEMY OF ORAL PATHOLOGY TO HOLD MEETING FEBRUARY 9

The first annual meeting of the American Academy of Oral Pathology will be held at the Stevens Hotel in Chicago, February 9, according to Lt. Col. Joseph L. Bernier, secretary and pathologist to the American Registry of Pathology.

The morning session of the meeting will be devoted to administrative business and the afternoon session to scientific presentations. Anyone interested is invited to attend.

ORTHODONTISTS TO MEET FEBRUARY 2-5 IN DALLAS

The Southwestern Society of Orthodontists will hold its twenty-sixth annual meeting February 2-5 in Dallas, according to J. O. Bailey, Wichita Falls, Texas, secretary of the society.

THOMAS HINMAN CLINIC TO BE HELD IN ATLANTA MARCH 23-25

The Thomas P. Hinman Midwinter Clinic will be held March 23-25 in Atlanta, Ga., under the auspices of the Fifth District Dental Society.

Steve A. Garrett is chairman of the meeting. Joseph D. Osborne is treasurer, and Arthur F. Link is chairman of the exhibit committee.

Speakers will be: Hamilton B. G. Robinson, Ohio State University; Edward C. Dobbs, Baltimore College of Dental Surgery; J. F. Volker, Tufts College; W. C. McBride, University of Detroit; Reed O. Dingman, University of Michigan; Vincent R. Trapozzano, University of Pennsylvania; and Charles H. M. Williams, University of Toronto.

SOCIETY FOR ANESTHESIA IN DENTISTRY TO MEET MARCH 24

The spring meeting of the American Society for the Advancement of General Anesthesia in Dentistry will be held March 24 at the Hotel New Yorker, New York, according to M. Hillel Feldman, executive secretary.

The scientific session will consist of a symposium in which L. L. Greenblum, Akron, Ohio; Robert M. Patterson, Turtle Creek, Pa.; Leonard F. Prendergast, Cleveland, Ohio; and Dr. Feldman will participate.

SYMPOSIUM ON PERIODONTIA HELD BY SCIENTIST GROUP

A symposium on the biologic aspects of periodontal disease was held recently in Boston by the subsection on dentistry of the American Association for the Advancement of Science.

Speakers at the symposium included: Balint Orban, Chicago College of Dental Surgery, Loyola University; Theodor Rosebury, College of Physicians and Surgeons and School of Dental and Oral Surgery, Columbia University; Edward G. Hampp, National Institute of Health, Bethesda, Md.; Samuel C. Miller, School of Dentistry, New York University; Julian M. Firestone, School of Dentistry, New York University; J. T. O'Rourke, Tufts College Dental School; Lester W. Burket, School of Dentistry, University of Pennsylvania; and Irving Glickman, Tufts College Dental School.

Others on the agenda were: D. E. Ziskin, School of Dental and Oral Surgery, Columbia University; William W. Wainwright, University of Rochester; Paul E. Boyle, School of Dentistry, University of Pennsylvania; Henry M.

Goldman, Massachusetts General Hospital and Beth Israel Hospital, Boston; and Isaac Schour and Maury Massler, College of Dentistry, University of Illinois.

LARGE ATTENDANCE REPORTED AT NEW YORK DENTAL MEETING

An unusually high enrollment figure for the Greater New York Dental Meeting, held December 9-13, has been reported by Willard S. Bell, chairman of the organization committee for the meeting.

The total attendance of 17,662, which was 3,644 above that for 1945, included dentists from thirty-eight states and twenty-three foreign countries. The registrants were composed of 10,538 dentists, as compared with 7,302 last year, 370 students, 1,084 hygienists, 1,763 technicians, 924 dealers, 888 exhibitors and 2,095 guests of dentists.

PIONEER DENTAL WORKSHOP HELD FOR OHIO DELEGATES

Delegates from all dental societies in Ohio met to formulate plans for increasing community dental health services throughout the state at a dental planning workshop held recently in Columbus.

The workshop was sponsored by the Council on Dental Health of the American Dental Association, the Ohio State Dental Society and the Ohio Department of Health.

The workshop, first of its kind in the country, considered six major topics under Ralph E. Creig, Cleveland, chairman. The topics were: present status of dental health of Ohio residents, dental manpower, ability of the people to pay for dental services, methods of payment, present status of preventive dentistry and existing dental health programs.

Among the speakers were Leroy Johnson, Columbus, chairman of the Ohio Council on Dental Health, and W. W. Hurst, Cleveland, president of the Ohio State Dental Society.

ORTHODONTIC SOCIETY TO HOLD SCIENTIFIC SESSION APRIL 14

The Central Section of the American Association of Orthodontists will hold a scientific session at the Radisson Hotel, Minneapolis, April 14-15, according to C. R. Baker, Evanston, chairman.

RANDOLPH BISHOP RESIGNS AS EDITOR OF DENTAL HEALTH

The National Dental Hygiene Association, Washington, D. C., has announced the resignation of Randolph G. Bishop as executive secretary of the Association and editor of *Dental Health*.

The association also announced that its headquarters are being moved from Washington to 6 East Forty-Fifth St., New York. Mr. Bishop will continue as secretary of the board of trustees of the association.

Cleveland Health Museum Photo

Transparent Tooth

Joseph Lucas, designer of the transparent tooth exhibited by the Cleveland Dental Society at the Cleveland Health Museum, is shown putting the finishing touches on the plastic structure in the Museum's studios. The tooth, fifty times life-size, was exhibited as part of the child dental health display sponsored by the society

Dental Corps Officers Visit Japanese Dental Society

Two U.S. Navy dentists and one Army Dental Corps officer, all stationed in Sapporo, Hokkaido, Japan, are shown attending a meeting of the local dental society. They are, from left to right at the speaker's table, Lieut. Harvey Hruska, Capt. G. I. Thomas and Lieut. Frank N. Ellis. Captain Thomas lectured on "The Preparation and Use of the Three-Quarter Crown in Anterior Bridgework" before an audience of approximately fifty local dentists

WORLD DENTISTRY

CANADIAN DENTAL RESEARCH COMMITTEE IS ESTABLISHED

The National Research Council of Canada, on the petition of the Canadian Dental Association, has established the Associate Committee on Dental Research with the purposes of stimulating research related to dentistry, coordinating dental research in Canada and advancing the application of research results toward improved national dental health.

The committee, under the chairmanship of R. G. Ellis, director of the dental clinic, University of Toronto, and chairman of the research committee of the Canadian Dental Association, will make grants-in-aid for approved projects of dental interest. The committee is at present supporting research on the chemical mechanisms in the decrease of dental caries by fluorides, studies of nitrous oxide for dental anesthesia and improvement of the acrylic resin denture base.

The committee is encouraging application for grants-in-aid for any project related to the dental field. Application forms may be secured from S. J. Cook, secretary, National Research Council, Ottawa, Canada.

AUSTRALIAN DENTAL CONGRESS SEEKS FILMS, OTHER MATERIAL

Papers, films and clinics have been requested from the United States for use in the eleventh Australian Dental Congress, to be held in Perth, Western Australia, May 24-29, 1948. This will be the first Australian Congress since 1939.

T. Flintoff, secretary for the Congress, has invited members of the American Dental Association to attend the Congress and has asked for contributions of films and other material. All such material will be returned.

The clinical program for the Congress will consist of the following sections: pathology, bacteriology, research, oral surgery, conservative dental surgery, prosthetics, preventive and juvenile dentistry, orthodontia, dental services, films, economics, hobbies and silent clinics.

Anyone interested in lending material to the Congress should write Dr. Flintoff, 220 St. George's Terrace, Perth, Western Australia.

DENTAL JOURNALS, TEXTS ARE NEEDED IN CZECHOSLOVAKIA

Dental journals and textbooks are urgently needed for the libraries of the dental schools in Czechoslovakia. Back copies of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION and the *Journal of Dental Research* from 1939 through 1946 are especially needed in order to fill in the gaps created by World War II.

Journals and textbooks should be sent to Joseph F. Volker, Tufts College Dental School, 416 Huntington Ave., Boston. Dr. Volker will forward the material to the schools of Czechoslovakia.

DR. BIBBY ELECTED HEAD OF ODONTOLOGICAL ASSOCIATION

Basil G. Bibby, dean of the Tufts College Dental School, was elected president of the Pan American Odontological Association at the tenth annual meeting. He succeeds Allen T. Newman, New York, in office.

The meeting was held in New York to celebrate the tenth anniversary of the organization.

DR. TYLMAN TO APPEAR BEFORE LATIN AMERICAN DENTAL GROUPS

Stanley D. Tylman, professor of prosthetic dentistry at the College of Dentistry, University of Illinois, is at present in South America teaching, lecturing and giving clinics before dental groups. His visit was arranged through the U. S. Department of State and several national dental associations in South America.

Dr. Tylman has been appointed by Sterling V. Mead, president of the American Dental Association, as official delegate from the American Dental Association to the Bolivian Dental Association during his stay in South America. He will appear before student and professional groups in Bolivia, Argentina, Peru, Chile, Uruguay, Brazil and Puerto Rico.

NEW ORTHODONTIC SOCIETY IS FOUNDED IN GUATEMALA

The founding of a new Latin American Dental Society—the Guatemalan Society of Orthodontics and Related Sciences—has been announced. The society has dedicated itself to the promotion of closer cooperation and the encouragement of study and scientific exchange of ideas between Guatemala and the United States. Enrique Estrada, Guatemala, is secretary of the new organization.

DENTAL EDUCATION

SAN FRANCISCO ALUMNI TO HOLD MEETING MARCH 3-4

The 1947 meeting of alumni of the School of Dentistry, College of Physicians and Surgeons, San Francisco, will be held March 3-4, with an additional meeting for golf to be held March 5. Francis J. Herz, San Francisco, is in charge of committees for the meeting.

The School of Dentistry has also announced the following appointments and citations. Henry M. Leicester has been made a member of the advisory committee of the Edward F. Smith Memorial Collection on the History of Chemistry at

the University of Pennsylvania. J. C. Geiger has been awarded the *Benemerito de la Salubridad Continental* by the government of El Salvador for scientific work in the field of public health.

Frederick T. West, professor of orthodontics, has been appointed secretary of the Pacific Coast Society of Orthodontists, succeeding Earl F. Lussier. Samuel Brown has been appointed clinical instructor of operative dentistry in the children's dentistry department of the school. Charles A. Sweet, associate clinical professor of operative dentistry, has been selected as director of a special course in dentistry for children under the auspices of the Los Angeles County Council on Dental Health.

SEMINAR IN DENTAL MEDICINE HELD AT SOUTHERN CALIFORNIA

The annual seminar for the study and practice of dental medicine was held recently by the College of Dentistry, University of Southern California, Los Angeles. A fellowship was awarded to R. E. Daniels as an outstanding senior student at the college.

Seventy-two candidates received the degree of doctor of dental surgery at the forty-ninth annual commencement exercises held recently by the college. Seventeen women received degrees or certificates in dental hygiene.

Latest appointments to the faculty of the College of Dentistry include: Wilbur A. Tully, oral pathology; J. Clifford Willcox, oral pathology; Jack R. Brandon, oral pathology and oral surgery; Thurman A. Baldwin, prosthetic dentistry; Alvin M. Larson, prosthetic dentistry; LeRoy N. Nisson, operative dentistry; Antone W. Nisson, operative dentistry; and Ronald H. Sims, oral surgery at the Los Angeles General Hospital.

Recent promotions at the college include Stuart H. Vaughan to assistant professor of prosthetic dentistry, and Sidney Cross to assistant professor of orthodontics.

DR. BRAUER TAKES OFFICE AT UNIVERSITY OF WASHINGTON

John C. Brauer took office February 1 as director of postgraduate dental education and professor of dentistry for children at the School of Dentistry, University of Washington, Seattle.

Dr. Brauer formerly taught at the University of Nebraska and the Atlanta-Southern Dental College, and was head of the department of preventive dentistry and director of the bureau of dental hygiene, College of Dentistry, State University of Iowa.

LOUISVILLE DENTAL LIBRARY LISTS TEXTS FOR DISPOSAL

Margaret Lavin, librarian of the School of Dentistry, University of Louisville, has announced a list of journals and textbooks which the library has for disposal. Anyone interested in securing any of the material should communicate with Miss Lavin at The Library, University of Louisville, School of Dentistry, Louisville 2. The list of material available is as follows:

American College of Dentists, Journal: v.11, 1944, and v.12, March-June, 1946.

American Dental Association, Journal: v.8, April - December, 1921; v.9, January - April, June, October, November, 1922; v.10, 1923; v.11, 1924 (February missing); v.12, January, February, May, June, December, 1925; v.13, February, March, June-August, October, November, 1926; v.14, January-April, June-September, November, 1927; v.15, January-March, October-December, 1928; v.16, 1929; v.17, February - July, September - December, 1930; v.18, January-February, April-December, 1931; v.19, February-December, 1932; v.20, 1933 (March, June, September missing); v.21, 1934; v.22, 1935 (October missing); v.23, 1936 (January, April missing); v.24, 1937 (August missing); v.25, February, May, June, July, September-December, 1938; v.26,

1939 (June missing); v.27, 1940 (March, November missing); v.28, January, February, June-October, December, 1941; v.29, February, May, August, 1942; v.30, November, December, 1943; v.31, July-November, 1944.

Dental Items of Interest: v.59, May, August, November, 1937; v.60, January, April, June-November, 1938; v.61, 1939; v.62, February-December, 1940; v.63, June-September, 1941; v.64, October, 1942; v.66, January, March, 1944; v.67, March, April, 1945.

Textbooks: Burchard, H. H., *Text-Book of Dental Pathology,* Lea Brothers, 1898; Dewey, Martin, *Practical Orthodontia,* second edition, C. V. Mosby Co., 1916; Gorgas, F. J. S., *Dental Medicine,* sixth edition, Blakiston Co., 1899, and seventh edition, 1905; Harris, C. A., *Principles and Practices of Dentistry,* thirteenth edition, Blakiston Co., 1911; Hogeboom, F. E., *Practical Pedodontia,* C. V. Mosby Co., 1924; Johnson, C. N., *Text-Book of Operative Dentistry,* third edition, Blakiston Co., 1911; Long, Eli H., *Dental Materia Medica,* Lea Brothers, 1903; Marshall, J. S., *Mouth Hygiene and Mouth Sepsis,* second edition, J. B. Lippincott Co., 1916.

ARMY AND NAVY

GENERAL KIRK AWARDED FRENCH LEGION OF HONOR

Maj. Gen. Norman T. Kirk, Surgeon General of the U. S. Army, has been awarded the Cross of the Legion of Honor at the office of the French military attaché, Washington, D. C.

The medal, in the degree of commander, was awarded by Gen. Raymond Debendetti, Surgeon General of the French Army. Brig. Gen. Raymond W. Bliss, U. S. Army Deputy Surgeon General, was awarded the Legion of Honor in the degree of chevalier.

COLONEL DART NAMED HEAD OF ARMY INSTITUTE OF PATHOLOGY

Col. Raymond O. Dart of the Army Medical Corps has been appointed director of the Army Institute of Pathology, Washington, D. C., according to Maj. Gen. Norman T. Kirk, Surgeon General of the Army.

Colonel Dart has spent eight years at the Army Medical Museum and the Army Institute of Pathology, part of the time as curator. His appointment comes as the Institute of Pathology is embarked on a program of expansion. The Institute now comprises four major departments: the Department of Pathology, the Army Medical Illustration Service, the Army Medical Museum and the American Registry of Pathology.

POSTGRADUATE COURSES GIVEN AT NAVAL DENTAL SCHOOL

One class of dental officers in each of four six-month postgraduate courses will be started March 31 at the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md., according to Rear Admiral A. W. Chandler, Chief of the Dental Division.

The courses are: general postgraduate course, specialized postgraduate course in oral surgery, specialized postgraduate course in prosthodontia and specialized postgraduate course in maxillofacial and ocular prosthesis. All dental officers on active duty may submit requests for these courses.

NAVY DENTISTS DEVELOP NEW TECHNIC IN EYE PROSTHESIS

Details of the revolutionary contribution to eye prosthesis made by dentistry during the war were described recently in a news story written by Ruth Dean, daughter of H. Trendley Dean, Dental Director of the National Institute of Health, Bethesda, Md. The story appeared in the *Washington Star.*

The new technic for making prosthetic eyes as related in Miss Dean's article was developed by a group of officers at the Naval Dental School in Bethesda, Md.

The new plastic eye produced by the Navy Dental Corps is fashioned from an exact impression of the eye socket, unlike stock glass eyes, according to the story.

COL. GLASSCOCK ASSIGNED TO McCORNACK GENERAL HOSPITAL

A list of recent transfers of duty issued by the Army Dental Corps includes the assignment of Col. Campbell H. Glasscock as Chief of the Dental Service at McCornack General Hospital in Pasadena, Calif.

Colonel Glasscock replaces Col. Rex McK. McDowell, who has been transferred to the Sixth Army.

Col. James B. Mockbee has been assigned to Fort Bliss, Texas, as post dental surgeon, and Lt. Col. Robert E. Hammersberg has been transferred to the Army and Navy Medical Procurement Office in New York.

ALFRED B. BEARD PROMOTED TO RANK OF COLONEL IN RESERVES

Alfred B. Beard, Johnston City, Tenn., was promoted to the permanent rank of full colonel in the Officers' Reserve Corps of the Army Dental Corps. He was discharged from service in October 1945, after five and a half years with the Army Air Forces. Dr. Beard is now on duty, with civilian status, with the Veterans Administration, stationed at Mountain Home, Tenn.

COL. WILLIAM SIEFERT CITED FOR MERITORIOUS SERVICE

Col. William H. Siefert has been awarded the Army Commendation Ribbon for meritorious service as station dental surgeon at Camp Crowder, Mo., from September 23, 1942, to March 31, 1946.

The citation commends Colonel Siefert for the "exceptionally superior manner" in which he discharged his duties at the station.

Photo by Ben Raast

Dr. Wells Cited

C. Raymond Wells, president of the American Dental Association from 1943 to 1944, is awarded the Legion of Merit for "outstanding service" with the U. S. Navy as assistant chief of the medical division, National Selective Service System. Maj. Gen. Lewis B. Hershey, director of Selective Service, is shown pinning the medal on Dr. Wells while Col. Louis F. Renfrow reads the citation

PUBLIC HEALTH

HERMAN HILLEBOE NAMED TO BUREAU OF STATE SERVICES

Herman Hilleboe, medical director of the Tuberculosis Control Division, U. S. Public Health Service, has been appointed to the newly created post of assistant chief, Bureau of State Services, U. S. Public Health Service. He will continue to serve as head of the Tuberculosis Control Division.

AAPHD TO HOLD BUSINESS MEETING ON FEBRUARY 9

The American Association of Public Health Dentists will hold a business meeting February 9 in the Stevens Hotel in Chicago, according to Carl L. Sebelius, Tennessee State Department of Health, secretary.

Other new officers of the association elected at a recent meeting are: Edward

Taylor, dental director of the Texas State Department of Health, president; Frank P. Bertram, Oklahoma State Health Department, president-elect; Harry B. Millhoff, Ohio Department of Health, treasurer; and Frank C. Cady, U.S. Public Health Service, editor.

VERMONT HEALTH COUNCIL TO EXPAND HEALTH PROGRAM

The Vermont State Health Council has been reorganized to coordinate health programs in the state, with plans for the expansion of child health service to include medical and dental examinations.

The council has established as a goal the revision and expansion of the state public health department and coordination of the public health department, hospitals, medical schools and laboratories. Frank C. Angell, Randolph, president of the state medical society, was elected president of the council.

NEW YORK STATE DENTAL BUREAU NAMES TWO TO HEALTH POSTS

Two temporary appointments have been made to the Division of Maternal and Child Health of the New York State Dental Bureau during the absence of David B. Ast, who is working with displaced persons in Europe.

The new members of the department staff are Sylvia Zappler and Robert O'Neill. Dr. Zappler directed the school dental clinic in Vienna prior to her arrival in this country. Dr. O'Neill has been doing graduate work at the School of Public Health, Columbia University.

DR. CHRIETZBERG APPOINTED ILLINOIS DENTAL DIRECTOR

John Chrietzberg, Birmingham, Ala., has been appointed director of the dental division of the Illinois State Department of Health and has already taken over the duties of his new post.

Dr. Chrietzberg spent a term as acting director of the dental division of the Alabama State Department of Health before coming to Illinois.

MARTHA ELIOT TO BE FIRST WOMAN PRESIDENT OF APHA

Martha M. Eliot, associate chief of the Children's Bureau, will be the first woman ever to become president of the American Public Health Association when she takes office at the 1947 annual meeting.

Dr. Eliot became president-elect of the association at its recent meeting in Cleveland. The newly installed president is Harry S. Mustard, director of the DeLamar Institute of Public Health at Columbia University.

GENERAL NEWS

NATIONAL SOCIAL HYGIENE DAY WILL BE HELD FEBRUARY 5

The American Social Hygiene Association has announced that the annual National Social Hygiene Day for 1947 will be held February 5 with the slogan "Stamp Out Venereal Disease."

The emphasis for the 1947 campaign against venereal disease will be on teamwork and community action, according to Walter Clark, executive director of the association.

A.M.A. DELEGATES HOLD FIRST MIDWINTER MEETING

The House of Delegates of the American Medical Association started regular semiannual meetings with the first official midwinter session December 9-11 in Chicago. The three-day supplemental session was held in addition to the meeting of the House of Delegates in San Francisco last July.

Among the resolutions adopted by the House at the Chicago session was a motion that the American Medical Association cooperate with the American Society of Anesthesiologists and other medical organizations in programs celebrating the centenary of the first public demonstration of the use of ether as an anesthetic by W. T. G. Morton in Boston in 1846.

A resolution on closer cooperation between the medical and dental professions was introduced by C. B. Conklin, District of Columbia. The motion called for the appointment of a committee of five to cooperate with a similar committee of members of the dental profession and asked that each state medical association be urged to appoint a committee to bring about closer cooperation between physicians and dentists. The Reference Committee on Medical Education recommended to the House that the resolution was "worthy of serious consideration and study by the Board of Trustees of the American Medical Association."

The committee of the whole of the House of Delegates adopted various portions of the Rich report, a study of the American Medical Association by a public relations firm.

The report recommended that the functions of scientific medicine and public relations be separated distinctly and that each council and bureau be requested to develop specific plans for practical cooperative relationships with all legitimate organizations of cognate interests.

Another recommendation was the proposed appointment of an assistant director in charge of liaison with voluntary professional and lay organizations in the field of popular health education. It was also moved that present out-of-date pamphlets be withdrawn from distribution and that whenever publications are found to be out of date they are to be withdrawn and rewritten.

The committee approved the recommendation of "fundamental principles" pointing out that: "To build up desirable public relations there are three essentials for the American Medical Association as for any other organization: positive and constructive policies; effective, adequate and coordinated action; balanced and efficient promotional and interpretive facilities."

WILLIAM T. WALLACE, CALLED OLDEST DENTIST, DIES AT 96

William T. Wallace, Columbus, Ohio, died December 4 at the age of 96 after seventy-six years of continuous practice. He has been described as the oldest practicing dentist in the United States.

Dr. Wallace, who was active in his profession until a few days before his death, was graduated from the Pennsylvania College of Dental Surgery, Philadelphia, in 1881. He practiced first in West Chester, Ohio, in 1870 and later moved to Columbus.

DR. J. O. McCALL RETIRED AS GUGGENHEIM CLINIC DIRECTOR

The Murry and Leonie Guggenheim Dental Clinic, New York, has announced the retirement of John Oppie McCall as director of the clinic. Daniel F. Tobin, former assistant director, has taken over as director, and Anthony S. Mecca has been appointed assistant director.

Dr. McCall plans to return to the practice of periodontia, which he gave up to become director of the clinic in 1929, shortly after it was founded. He has also been active in organizing and teaching a new course in dental hygiene under a new New York state law.

Dr. McCall was a staff member with the University of Buffalo, Columbia University and the College of Dentistry, New York University. He was a founder and past president of the American Academy of Periodontology.

COMMITTEE ON ECONOMICS

TWO STATES, U.S. RAILROADS, NOW COVER 5.5 MILLION WORKERS FOR COMPULSORY CASH SICKNESS BENEFITS

While the attention of the public has been focused in recent years upon proposals for establishment of a national compulsory health insurance program, other state and federal social insurance proposals providing for compulsory cash sickness benefits were enacted with little notice. This development merits study inasmuch as it differs significantly from national compulsory health care proposals, and appears to indicate a line of progress along distinctly different avenues. It differs in that the program generally can be expected to proceed on the state level; that the laws provide cash benefits for workers instead of medical care benefits in kind; and that three proposals have become legal actualities instead of remaining subjects for controversial discussion.

In 1942, Rhode Island passed a law providing for the payment of cash benefits to workers who became ill. During the past year, two additional groups of workers have been covered under similar legislation. The California state legislature passed an act establishing cash sickness benefits for employees of business and industry in that state. The last session of Congress passed a law which provides similar benefits for all railroad workers. Benefits will become payable under the California and the Railroad Cash-Sickness laws during 1947. An estimated five and a half million workers are covered by these three laws, about 300,000 in Rhode Island, 3,900,000 in California and 1,500,000 in the railroad industry. This is approximately 10 per cent of the total number of workers in the United States.

Essentially, this type of legislation assures covered employees a minimum income for a limited period of illness or disability. The benefit is determined by the worker's average income during his previous year of employment, according to varying formulas. There are no indemnity provisions which relate payment to the type of illness or injury or costs of medical or surgical care. The benefit is merely a cash payment to replace a portion of the income lost because of illness. Information from Rhode Island indicates that the benefits are available not only in instances of medical disability, but also for disability of dental origin. Technically, the cash-sickness benefits are provided under amendments to existing laws which established unemployment compensation in all states and for practically all employees of the railroad transportation industry in the United States.

In recent years, similar bills were in-

troduced in a number of other states, but failed to pass. In 1943 and 1944, for instance, bills providing for cash sickness insurance were introduced in the legislatures of the following eight states: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Washington and Wisconsin. It is possible that new bills will be introduced in the foregoing states or others during the year 1947.—*J. E. Bagdonas, Secretary.*

COUNCIL ON DENTAL THERAPEUTICS

COUNCIL ANNOUNCES DECISION ON SYNTHETIC FLUORIDE TABLETS

DURING the past year, many tablet preparations which contain some synthetic salt of fluorine, usually calcium fluoride, and one or more vitamins have been offered to dentists for use as dietary supplements in the control of dental caries. The recommended dosages would provide up to 3 mg. of calcium fluoride daily, an amount which appears not to be stored to a significant extent in the human body.[1]

The use of fluorides in caries therapy is based on the finding that an inverse relationship exists between the amount of fluorine occurring naturally in drinking water supplies (up to 1 part per million) and the incidence of tooth decay in school-age children.[2] No direct evidence is available to substantiate the hypothesis that the addition of synthetic fluorides to otherwise fluorine-free waters is efficacious in the control of caries, although demonstrations designed to clarify this point are in progress.

Direct clinical evidence of the effect on caries of dietary supplements of solid synthetic fluorides is meager. There is evidence[3] which indicates a decrease in the number of new dental lesions in children who received daily supplements of 3 mg. of calcium fluoride for periods of six and eight months. However, certain factors, among them the comparatively small numbers of persons in the experimental groups which consisted of fifty-seven, thirty, sixty-eight and seventy-three subjects, respectively, wide age range of subjects (8 to 16 years) and lack of adequate control in all phases of the study, render a positive conclusion impossible. A hypothesis that fluorapatite may be formed on the surface of the enamel by reason of the presence of fluorides in the saliva after chewing and ingestion of tablets containing calcium fluoride and vitamins C and D appears to be unwarranted in view of the insignificant secretion of fluorine in the saliva,[4] the comparative insolubility of calcium fluoride and the complexity of the physiologic process by which apatite-like material is deposited in bones and teeth.

Differences in caries incidence which Strean and Beaudet assumed to indicate

The Council on Dental Therapeutics has authorized publication of this report.

1. McClure, F. J., and Others, Balances of Fluorine Ingested from Various Sources in Food and Water by 5 Young Men; Excretion of Fluorine Through the Skin. *J. Indust. Hyg. & Toxicol.* 27:159 (June) 1945.

2. Jay, Philip, Fluorine and Dental Caries. *J.A.D.A.* 33:489 (April 1) 1946.

3. Strean, L. P., and Beaudet, J. P., Inhibition of Dental Caries by Ingestion of Fluoride-Vitamin Tablets. *New York State J. Med.* 45:2183 (October 15) 1945.

4. Wills, J. H., Secretion of Intravenously Injected Fluorine in Submaxillary Saliva of Cats. *J. D. Res.* 19:585 (December) 1940.

a synergistic effect of vitamins C and D with fluorine are without apparent significance, owing to wide individual variation. In this connection it is of interest to note that available knowledge fails to indicate whether dietary influences continue to act on the teeth after they are completely formed.[5] The employment of vitamins as a therapeutic measure against dental caries is largely presumptive, whether they are used in conjunction with calcium fluoride or other fluorides.

Though probably not dangerous in amounts recommended for daily consumption, fluoride added to diets already high in fluorine content or consumed in areas where water supplies contain significant concentrations of fluorine may constitute a health hazard. This possibility and the inconclusive nature of experimental evidence concerning their effectiveness render synthetic fluoride and fluoride-vitamin preparations for use in the treatment of dental caries not acceptable for inclusion in Accepted Dental Remedies at this time. The Council recognizes that the potential value of scientifically formulated oral fluoride preparations may be established at some future time, and will give consideration to further data as they appear.

5. A.D.A. Research Commission, *Dental Caries.* New York: 1941 (second edition), p. 252.

BONE MEAL PREPARATIONS NOT ACCEPTABLE TO THE COUNCIL

DURING recent months there have appeared on the market a number of preparations containing powdered cattle bone supplemented with vitamin D for the treatment and prevention of dental caries. Basis for their use is the assumption that active tooth decay is, to a significant extent, a manifestation of individual or combined deficiencies of calcium, phosphorus, fluorine and vitamin D. Although it may be conceded that these dietary factors, with the possible exception of fluorine, are essential during the development of the teeth, available evidence does not indicate whether they are important after tooth formation is completed.[1] Despite the array of reports attributing to fluorine a caries-inhibiting role, analysis of the literature on this subject[2] discloses a lack of conclusive information. This lack renders largely presumptive any course of treatment in which fluorides, natural or synthetic, are ingested to influence the incidence and severity of the disease.

Harootian[3] and Martin[4] have reported clinical evidence regarding the use of bone meal in the treatment of dental decay. The former observed a beneficial effect and credited it to the fluorine content of the bone, but inadequacies in the number of subjects (nine) and their control render positive interpretation of the results hazardous. The work of Martin is similarly inconclusive. Besides failing to demonstrate whether bone meal is effective against caries, these data leave an element of doubt as to the desirability of, or the necessity for, supplementation by vitamins. In addition,

The Council on Dental Therapeutics has authorized publication of this report.

1. A.D.A. Research Commission, *Dental Caries.* New York: 1941 (second edition), p. 252.

2. Jay, Philip, Fluorine and Dental Caries. *J.A.D.A.* 33:489 (April 1) 1946.

3. Harootian, S. G., The Influence of Administration of Bone Flour on Dental Caries. *J.A.D.A.* 30:1396 (September 1) 1943.

4. Martin, E. M., Report on Clinical Use of Bone Meal. *Canad. M.A.J.* 50:562 (June) 1944.

the finding that fluorine ingested in the form of bone meal is largely excreted in the feces may be significant.[5] It follows, therefore, that, until further direct evidence becomes available, bone meal-vitamin D preparations must be considered as having no more than potential usefulness in the therapy of tooth decay.

In view of the lack of evidence to show that they are effective, preparations of bone meal for the treatment of dental caries are declared not acceptable for inclusion in Accepted Dental Remedies. New evidence will be considered by the Council as it appears.

5. McClure, F. J., and Others, Balances of Fluorine Ingested from Various Sources in Food and Water by 5 Young Men; Excretion of Fluorine Through the Skin. *J. Indust. Hyg. & Toxicol.* 27:159 (June) 1945.

COUNCIL LISTS PRODUCTS FOR "ACCEPTED DENTAL REMEDIES"

THE Council on Dental Therapeutics announces the inclusion of the following products in the list of Accepted Dental Remedies:

Denture Adherent Powders[1]

Moy Holding Powder: Each 100 gm. is stated to contain karaya gum, 90.14 gm.; sodium tetraborate, 9.82 gm.; and oil of peppermint, U.S.P., 0.04 gm. Manufactured by the J. Bird Moyer Company, Philadelphia.

Admission of a product to the list of Accepted Dental Remedies means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics which is available upon request, and inquiries are welcomed.—*Donald A. Wallace, Secretary.*

1. *J.A.D.A.* 33:1593 (December 1) 1946.

COMMITTEE ON LIBRARY AND INDEXING SERVICE

LIBRARY REPORTS MORE REQUESTS FOR CIVILIAN PRACTICE MATERIAL

FOLLOWING is a digest of the annual report of the Committee on Library and Indexing Service which was presented at the eighty-seventh annual meeting of the American Dental Association in Miami, October 14-16, 1946:

The Committee on Library and Indexing Service has found that the type of library material sought has shifted from wartime information to material on civilian practice. Review material for examinations and literature pertaining to office planning, modern materials and improved technics have been requested.

Many inquiries from abroad have been re-

ceived concerning dental publications.

Murrell C. Wellman has been employed as assistant librarian. He has an A.B. degree from the Central Y.M.C.A. College in Chicago, has completed his junior year at the Chicago College of Dental Surgery, Loyola University, and holds a B.L.S. degree from the University of Chicago Graduate Library School.

The 1942-1944 volume of the *Index to Dental Literature* has been increased by one-third over previous volumes, with a greater number of periodicals covered and with the inclusion of a list of classification headings designed to aid the research worker. Six new subscribers have been added to the list receiving monthly cards. At present 11,470 cards are mimeographed each month in the Central Office.

On January 1, 1946, Mrs. B. L. Kime, formerly assistant editor of THE JOURNAL, was added to the Index staff.—*John E. Gurley, Chairman.*

COMMITTEE ON LEGISLATION

INCOME TAX RETURNS TO BE FIGURED ACCORDING TO NEW REDUCTION LAW

INCOME tax returns, that are to be filed by March 15, 1947, are to be computed for the first time according to the 1946 tax reduction law. The following information has been prepared in nontechnical language to give the dentist a general explanation of some of the provisions in the income tax law. The technical examples are intended only to illustrate the effect of a general rule or of an exception to a general rule. Any question in relation to a person's return should be referred to his attorney for his opinion.

The tax this year will be less than it was last year on the same amount of taxable income. Although the normal rate remains at 3 per cent this year, the taxpayer is allowed to take all his $500 exemptions in arriving at the amount which is taxable at 3 per cent. Surtaxes have been decreased by 3 per cent in each surtax bracket. Also there is another tax reduction. After the combined surtax and normal tax rate has been determined, the result is only a tentative tax, which is further reduced by 5 per cent. Thus, if the income and the deductions and exemptions, have remained unchanged, the tax will be less.

Tax Formula

If the taxpayer figures out his tax by himself and uses long-form 1040, he will find the return easier to understand if he will refer to the following formula, which is the basis of form 1040:

Gross income minus
Business deductions is the

Adjusted gross income minus
Nonbusiness deductions is the

Net income minus
Exemptions is the

Taxable income times
Tentative surtax and normal
tax rate is the

Tentative tax times
5 per cent is the

Amount of reduction.

Tentative tax minus
Amount of reduction is the

Tax due

Items of Gross Income

Gross income includes all forms of compensation for personal service; income from

profession, trade or business; gains from transactions in property; interest; rent; dividends, and revenue from many other sources. All professional fees must be reported as income. Fees paid in property are to be reported at fair market value as of the time they were received.

Services Extending over a Three Year Period.—If personal services extend over a period of thirty-six months or more from beginning to end and 80 per cent of the total compensation for these services is received or accrued in any one year, the tax that would otherwise be due may be reduced. In these circumstances the taxpayer is permitted to recompute his tax for the previous years and to pay the tax that would have been due if the compensation had been received in equal monthly portions during the period from the start of the services to the date payment was received or accrued.

Dividends.—In general, all dividends are income and therefore fully taxable. Exceptions, however, include dividends on stocks or accounts with certain federal agencies, issued before March 28, 1942. Some are fully exempt, and others are exempt from the normal tax but are subject to the surtax. So-called dividends on unmatured life insurance policies are not taxable, but dividends on paid-up or matured policies are taxable as soon as the total distributions on the policies exceed the total amount paid for them.

Interest.—In general, all interest is income and therefore fully taxable, except interest paid on obligations of a state or a political subdivision thereof and interest paid on certain United States obligations which may be fully or partially exempt. Interest on all obligations of the United States or any agency or instrumentality thereof, including victory, war and savings bonds, issued on or after March 1, 1941 is fully taxable. If the taxpayer is on the accrual basis,* he includes in his income each year the amount of the increase in value of the bonds for that year. If the taxpayer is on the cash basis, he reports the entire increase in value in the year in which the bonds are surrendered. A taxpayer on the cash basis may elect to report the increase in value of the bond each year, but if he makes this election it is binding for all the following years.

Annuities and Life Insurance Endowments.—Amounts received each year from an annuity or a matured endowment policy to the extent of 3 per cent of the total consideration paid for the policy are considered to be interest income. The remainder of the amounts received each year is considered to be a return of the principal paid for the policy, and as soon as the total return of the principal equals the total consideration paid for the policy all amounts received thereafter are income and therefore taxable in full.

*See later section on cash and accrual bases of accounting.

Items Not Income

A gift or a bequest is not income for income tax purposes, but it may produce income, which is taxable. Amounts received as benefits from an accident or health insurance policy as well as amounts received in settlement of an accident involving a personal injury are not income. But disability retirement pay received under certain civil service retirement laws may be taxable in the same manner as an annuity. Also amounts received from life insurance policies on the death of the insured are not income.

Business Deductions

Professional Expenses.—Office expenses incurred by a dentist to produce income from his profession or from some other source are deductible. Allowable expenses include such items as accountant and attorney fees, contributions to state employment funds, expenses of attending professional conventions, dues of professional associations, payments to employees for injuries not compensated by insurance, license fees, repairs to property, theft losses not compensated by insurance, professional traveling expenses, salaries and wages, rent, light, heat, power, water, stationery, professional journals, postage, supplies, insurance, telephone and automobile upkeep. If a dentist has his office in his house for which he pays rent, he may deduct the rent allocable to the space so used as well as the cost of light and heat.

Depreciation.—Expenditures for new equipment or permanent improvements are not deductible as expenses. A deduction as depreciation will be allowed for exhaustion, wear and tear, including a reasonable allowance for obsolescence on property used in a profession or business. The usual method for figuring depreciation is to estimate the number of useful years of property after its acquisition and to deduct each year a proportionate amount

of the cost. The life usually applied to professional libraries is 30 years and to scientific equipment used by dentists 10 years. Office equipment is given a composite life of about 15 years, but it may be separated into groups and a definite number of years given to each group, such as safes 50 years, furniture 15 years, dictation machines 6 years.

Miscellaneous Deductions. —Besides the usual deductions of all ordinary and necessary expenses incurred in a profession, the law also allows expenses incurred for the production or collection of income or for the management, conservation or maintenance of property held for the production of income. Thus expenses incurred in having the amount of one's tax liability determined are deductible. However, no deduction is allowed for expenses incurred in earning tax-exempt income, but business deductions attributable to the earning of tax-exempt interest may be deducted.

Nonbusiness Deductions

Under certain conditions deductions may be taken for such items as charitable contributions, dental and medical expenses and taxes on personal expenditures. This deduction cannot be taken if the tax table on short-form 1040 is used or if the standard $500 deduction on long-form 1040 for an income of $5,000 or more is taken.

Charitable Contributions. —Contributions are deductible up to 15 per cent of the adjusted gross income if made to an organization operated exclusively for religious, charitable, scientific, literary or educational purposes or for the prevention of cruelty to children or animals; veterans' organizations, or governmental organizations for use exclusively for public purposes. Charitable contributions are not deductible if the standard deduction is elected.

Dental and Medical Expenses. —Expenditures for medical care, according to the Internal Revenue Code, include amounts paid for the diagnosis, cure, mitigation, treatment or prevention of disease or for the purpose of affecting any structure or function of the body and amounts paid for accident or health insurance. Amounts paid during the taxable year, which are not compensated for by insurance or otherwise, for dental or medical care of the taxpayer, his spouse or a dependent are deductible to the extent that those expenses exceed 5 per cent of his adjusted gross income. This deduction is limited to $1,250 if only one exemption is allowed and to $2,500 if more than one exemption is allowed. Expenses for dental or medical care are not deductible if the standard deduction is elected.

Optional Standard Deduction. —The law permits each person to elect a standard deduction in lieu of all nonbusiness deductions, such as charitable contributions, dental and medical expenses and taxes on personal expenditures; certain credits with respect to taxes of foreign countries and possessions of the United States, and credits relating to withheld interest on certain tax-free bonds and on certain obligations of the United States and certain government corporations.

The standard deduction is approximately 10 per cent of an adjusted gross income of less than $5,000. If the adjusted gross income is $5,000 or more, the standard deduction is a flat $500. In the case of husband and wife living together, the standard deduction will not be allowed to either if the net income of one is determined without regard to the standard deduction.

Servicemen

Members of the armed forces have the same tax liability as civilians, except for certain special considerations that are given to the Army, Navy, Marine Corps and Coast Guard.

Exempt Service Pay. —For all taxable years after December 31, 1940, there is excluded from gross income all service pay received by a member of the armed forces below the rank of commissioned officer. Commissioned officers, including commissioned warrant officers, are taxable on compensation received in 1943 and later years for active service only if it exceeds $1,500. Before 1943, commissioned officers received no exemption on account of service pay. Terminal leave pay is included in this exemption.

Normal and Surtax Exemptions

The law allows an exemption of $500 each as follows: one for the taxpayer; one for the wife of the taxpayer, if a joint return is filed (If separate returns are filed, the taxpayer may claim this exemption for his wife only if she has no gross income and is not a dependent of anyone else.); one for each dependent of the taxpayer.

Dependents. —The right to claim an exemption

for a dependent, either married or single, is based on the following qualifications:

1. The dependent must have had less than $500 gross income in 1946.

2. The taxpayer must have furnished over half the actual amount used for the support of the dependent in 1946.

3. The dependent must be one of the following relatives of the taxpayer: children, grandchildren, great grandchildren; stepchildren (but not their children); brothers, sisters; stepbrothers, stepsisters; half brothers, half sisters; parents, grandparents, great grandparents; stepfather, stepmother (but not their parents); nephews, nieces (but not their husbands or wives); uncles, aunts (but not their husbands or wives); in-laws—son, daughter, parent, brother, sister.

Legally adopted children are considered the same as children by blood.

In community property states the husband and the wife may agree who will take the exemption for a dependent supported from community funds.

Partnerships

A partnership is required to file a return for information purposes only. A partnership never pays an income tax, but each partner is required to report on his personal return his share of the net income of the partnership. A charitable contribution made by a partnership may not be deducted on the partnership return, but each partner may report his share of the contribution on his own return.

Cash and Accrual Bases of Accounting

The two common bases of accounting that are used in making income tax returns are the cash basis and the accrual basis. For example, suppose dental services are rendered in December 1946 and are paid for in January 1947. On the cash basis the amount received would be reported for the year 1947 because that is the year in which the cash was received. On the accrual basis the amount due would be reported for the year 1946 because that was the year in which the right to receive payment accrued. On the cash basis only cash items are reported, whereas on the accrual basis amounts earned but not received and debts incurred but not yet paid are included.

Thus fees for professional services rendered to a patient and not paid for, that are reported as income on the accrual basis and the income tax paid thereon, may be deducted as bad debts if they are never paid. Fees for professional services rendered to a patient and not paid for are not reported as income on the cash basis and therefore are not deductible as bad debts if never paid. On the cash basis, a deduction for a bad debt will not be allowed unless the bad debt involves a cash loss.

On the cash basis the taxpayer reports all amounts actually or constructively received and all amounts actually expended. An example of constructive receipt of income is interest credited by a bank on a savings account and added to the principal of the account.

A taxpayer on the cash basis cannot anticipate future expenses by paying out large sums in one year in order to reduce his tax in that year. Thus, insurance premiums in connection with a profession or a business, such as fire insurance, that are paid in advance for more than one year should be prorated for each year and the proportionate amount deducted each year regardless of whether the taxpayer is on the cash or the accrual basis. On the other hand, a one year policy need not be prorated by months by a taxpayer who is on the cash basis.

A dentist may report his professional income on the accrual basis and at the same time report his income from other sources on either the cash or the accrual basis, but whatever basis is first used it must be followed thereafter. A taxpayer cannot change his accounting methods for tax purposes without first securing permission from the commissioner.

Joint or Separate Return

A husband and a wife together may make a joint return, and, if so, the tax will be computed on their combined income. Marital status for the year is determined ordinarily as of the last day of the year. Thus if a man was married on or before December 30, 1946, he may claim an exemption for his wife if she had no gross income during 1946 and was not a dependent of anyone else. Couples who were divorced during the year may not file a joint return.

If one spouse dies during the year, the other may not file a joint return with the decedent, but in this case the marital status of the survivor is determined as of the date of the death. Thus a taxpayer may claim an exemption for his deceased wife if she had no gross income

from the beginning of the year to the date of her death and was not a dependent of anyone else.

A husband and a wife may elect each year to file a joint return or separate returns and may change their method in the following year. After a choice has been made and the return filed for a given year, however, that choice may not be changed for the same year unless the change is made before the last day for filing the return. The fact that an estimate was filed on either the joint or the separate basis does not affect the right to file a joint return or separate returns. Whether or not a joint return or separate returns should be filed depends on the circumstances in each case.

Advantage of a Joint Return.—Generally, if either the husband or the wife has a net income of less than $500, it would be better, with a few exceptions, to file a joint return in order to get the full benefit of the $1,000 combined exemption. An exception could occur if the spouse with the larger income had large dental, medical and hospital expenses. The deduction for these expenses is limited to their excess over 5 per cent of the adjusted gross income. Therefore, an increase in the amount of adjusted gross income on the return decreases the deduction that may be made for these expenses.

Another example of an advantage is the case in which one spouse has deductible items in excess of net income or deductible items and no income. In this case the allowable deductions of one spouse would be applied against the income of the other.

Advantage of a Separate Return.—If the husband and the wife have separate incomes and each net income is more than $500 and the total net income is more than $2,000 in excess of the allowable exemptions for themselves and their dependents, separate returns would be an advantage. This results from the application of lower surtax rates on the separate incomes than on the combined income if reported on a joint return.

If one spouse has an adjusted gross income of more than $5,000 and the other has an adjusted gross income of more than $500, separate returns may have another advantage in that they would permit each spouse to claim the optional standard deduction.

Alimony and Separate Maintenance

Payments made to a wife under a court decree divorcing or separating the husband and the wife are deductible by the husband and reported as income by the wife. If the decree specifically states that certain named amounts of the payments are to be used for the support of the minor children of the husband, the wife cannot be taxed on those amounts and the husband cannot deduct them. If the decree, however, awards payments to the wife for the support of herself and the minor children, without designating the amount for each, the wife is taxed on the entire amount. If she is taxed on amounts which she uses for the support of a dependent, she may claim exemption for the dependent if she contributes over half the support and the dependent has less than $500 income.

Community Property States

As a general rule in community property states, each spouse legally owns half the income received or earned by the other during the marriage and may report it on a separate return. There are exceptions, however, to this rule. Generally, whatever property is owned by either spouse prior to the marriage or is received as a gift or a bequest after marriage remains the separate property of the spouse. Thus in five of the nine community property states the separate owners are taxed on the income from separately owned property.

The right to divide community property income and to make two separate returns is an advantage whenever the combined taxable income exceeds the amount in the first surtax bracket. Thus, if the husband has a net income of $30,000 and the wife has no income, the tax will be less on two returns of $15,000 each than on one return of $30,000.

The community property states are: Arizona, California, Idaho, Louisiana, Nevada, New Mexico, Oklahoma, Texas and Washington.—*George H. Fox, Secretary.*

CASES AND COMMENTS

Tribute to Harvey J. Burkhart From the British Dental Association

Dear Dr. Scherer: I wish to convey to you and the American Dental Association on behalf of the British Dental Association, as well as on my own, our sincere condolences for the great loss that the whole profession has suffered in the death of that great dental philanthropist, Dr. Harvey Burkhart.

No dentist has done more for the advancement of prophylaxis in oral health than Dr. Burkhart whose organizing genius has made it possible to utilize the many generous endowments devoted to this objective by the late Mr. Eastman. The energy and perseverance displayed by Dr. Burkhart in supervising and advising the Eastman Clinics in London, Rome, Brussels and Stockholm are beyond praise.

The loss of such a man is irremediable. Dentists throughout the world must feel this, and we join in profound sympathy with the dentists in his own country.—*Lilian Lindsay, President, British Dental Association, 13, Hill St., Berkeley Square, London, W.1.*

The Group Movement in Great Britain

To the Editor: It has occurred to me that some explanation of the formation of Groups in British dentistry might be useful, as there is a possibility that these organizations may play an active part in the comprehensive dental health service later on.

You will be aware that, owing to the imperfect draft of the Dentists' Act of 1878, neither protection of practice nor of title was given to the L.D.S. As a result, a large body of unregistered practitioners emerged, a proportion of them being advertising quacks of a very undesirable kind. There were, however, many men who would have liked to qualify as dental surgeons if it had been possible, and they made gallant attempts to improve themselves by attending lectures and demonstrations given by qualified dentists and they endeavored to restrain the excesses of advertisers. These men first formed themselves into a society of extractors and adapters. Later, they became the Incorporated Dental Society (I.D.S.), which had rules and regulations and imposed a standard of ethics upon its members. The organ of this society, which still exists, is the *Mouth Mirror*. There never has been any class in Great Britain corresponding to the *Dentisten* of Germany or the *Zahntechniker* of Austria, which were incorporated bodies, and I believe the members are permitted only to take impressions and to make artificial dentures. If the technicians get what they want and what is recommended by Major General Helliwell in the new Health Insurance Act, they will correspond to the German and Austrian technicians.

In 1921, the Dentists' Register was opened and a large number of these unregistered men were taken in. They are generally referred to as "1921" men. This Dentists' Act of 1921 gave complete protection of title and practice to a much greater degree than the medical profession possesses. A proposition was brought forward immediately after the passing of the Act to make these 1921 men eligible for membership in the British Dental Association, but it was defeated after a severe struggle. In spite of repeated efforts, the last one in 1944, the British Dental Association and the Incorporated Dental Society are still separate entities.

The growth of the Public Dental Service, school and military, and the introduction of panel dentistry produced a third society, namely, the Public Dental Service Association (P.D.S.A.). Its organ is the *Dental Gazette*. There are thus three societies: (1) the British Dental Association, which is a society composed entirely of qualified registered dentists (a medical man whose name appears on the Medical Register is allowed to practice dentistry, but, even if he has a dental diploma or a degree in addition to his medical qualification, unless his name is on the Dentists' Register, he is not eligible for membership in the British Dental Association); (2) the Public Dental Service Association, which contains a mixture of 1921 dentists and qualified men; and (3) the Incorporated Dental Society, which is made up chiefly of 1921 men, with a sprinkling of qualified dentists. There are, in addition, a small percentage of dentists who belong to no organized society.

Although there was no amalgamation of the three societies, it became necessary to form a Dental Benefit Council, which provided

cooperation in negotiations with the Minister of Health and the approved societies (these are insurance societies, like the Prudential) which granted benefits. Representatives of the three dental societies, the insurance societies and the Ministry of Health made up the Council. At the same time, smaller local councils containing members of the three dental societies were formed voluntarily; these councils met and held friendly discussions as occasion demanded, generally in order to discuss scale of fees and administration in panel work.

With this new insurance act, it became necessary to form an *ad hoc* committee of the three societies, that is, a consultative committee, representing the whole profession, which could meet Aneurin Bevan, the Minister of Health, and put forward the case of the dental profession in the hope of guarding its interests.

For many reasons, which you will easily supply for yourself when it is borne in mind that the British Dental Association must start as a senior partner and ultimately become the sole society, great difficulties exist in any amalgamation of the three societies in the near future. However, the problem, whose solution was doubtful at the center, is being solved with surprising smoothness at the periphery by the formation of Groups. The first Group was started in London in 1941, and this movement spread over the south of England and has now reached the Midlands and the North. The Groups are autonomous, the amount of activities being dependent largely upon the enthusiasm and energy of the local group secretaries.

I was made chairman of the committee of the South Leicester Group, a position which I took only on the understanding that the vice-chairman was a 1921 man, and he happens to be the president-elect of the Incorporated Dental Society with whom I had worked amicably for many years. In some Groups, all the officers, chairman, secretary and treasurer, are 1921 men, the licenciates being merely committee members.

If you have managed to gather the type of administration and its setup from this discussion, you will understand the possible function of a body of dentists who can speak for every member of the profession in the city or county concerned, when nominations are made to the various health committees and councils and, in addition, its value in dental health negotiations with local authoritative bodies.

Just before the war, joint meetings were called throughout Great Britain and a number of war emergency councils were formed, covering three or four counties. Our particular council was called the District Dental War Committee and included Leicestershire, Rutland and Northampton. These councils were merely advisory; they deliberated upon the calling up of dentists for the forces and also of mechanics, either as dental mechanics for the forces or for the munition works, and the allocation of the remaining mechanics and dental nurses among the civilian dentists, and they acted generally as a committee of reference for all dental questions in the area. Perhaps it should be explained that a large number of dentists employ trained technicians or mechanics in their own laboratory workshops attached to the practice, although in large towns technical laboratories working for the profession are greatly on the increase.

Although these councils had no power of action, their recommendation has carried great weight, with the appropriate authorities making final decisions. Their secretary also acted as convenor when joint meetings were desirable to establish other activities, for example, the War Practice Protection Scheme and, later on, the Groups. It will be clear that already a great amount of cooperative effort between local dentists had been in existence during the war years. Despite the fact that the 1921 men were not selected for service in the dental services of the armed forces and have enjoyed a period of prosperity during the war years, our demobilized dental officers have shown very little jealousy with regard to these 1921 men and are quite ready to work harmoniously with them.

The newspaper report of the strike of 500 dentists is completely misleading.* What happened is this: In the panel service there is a free choice of dentists and a free choice of patients. The technicians' fees for making artificial teeth were so high that sometimes they exceeded the entire remuneration that

*Editor's Note: The report here referred to was noted in the February 15, 1946, number of THE JOURNAL under the title "500 British Dentists Strike To Raise Health Insurance Fees," and read as follows: "Five hundred British dentists are on an unofficial strike in Surrey, Sussex, Kent and Hampshire, according to the Associated Press release of December 6. The dentists, it was stated, refused to supply dentures to persons with health insurance, until the fees were raised to $42. The present fee is $25.50."

the dental practitioner received under the panel scheme for impressions and fitting of dentures. Accordingly, some of these men refused dental letters, that is, they refused to do prosthetic work for panel patients. The error crept in when they refused as a group instead of individually, and some of the group dentists possibly spoke too freely instead of referring the matter to headquarters. This, of course, was news, and journalists are much the same the world over.

Below is appended the resolution for the formation of Groups in Leicester which I think will give a fair idea of the spirit which is animating these groups in their inception.

Origin.—A Group is a free and autonomous association of registered dentists brought into being by the singular position in which British dentistry finds itself today, both from its history and from the form of government. Its intention is to provide at the periphery a coalition which, after repeated efforts, has not yet proved practicable at the center.

Its ideals and activities envisage neither incorporation nor formation of a fourth association. It has no headquarters, no annual subscription (expenses are covered by a voluntary donation, usually £1 per person) and may be described as a committee of citizen dentists; it discourages publicity and any resolutions which may be passed are destined to be sent to the three associations for information and action, to the end that these three associations may be able to speak with the assurance that they are voicing the agreed opinion of the whole of the dental profession.

Organization.—A Group covers the area of one or more Parliamentary Divisions, so as to b able to get into personal contact with the Members of Parliament. Everyone on the Dentists' Register is eligible for membership.

Membership.—Group activities are coordinated by a regional committee; regional activities by a central committee.

Objectives.—(1) To secure the active membership of every available practitioner; (2) to set up a standard of ethics; (3) to regularize surgery hours; (4) to give mutual help in case of illness, shortage of technicians, etc.; (5) to encourage its members to join one of the dental societies or associations; (6) to be vigilant in safeguarding the practice of dentistry in the public interest as an integral part of the health service.

Strikes are definitely not in the Group policy, but the arbitrary attitude of the ministers responsible for dental benefit, who have repudiated the findings of their own Statutory Advisory Committee, has forced the three societies to come into line with the attitude previously adopted by the Groups, namely, noncooperation in dental benefit.—*A. E. Rowlett, Carisbrooke, 238, London Road, Leicester, England.*

"Shrinkage During Casting of Gold and Gold Alloys"

To the Editor: In regard to the article on "Shrinkage During Casting of Gold and Gold Alloys" by George M. Hollenback and E. W. Skinner, which was published in the November 1 issue of THE JOURNAL, I think the following comments might be of interest to your readers.

Method

The method employed by Hollenback and Skinner is essentially the same as that used by Coleman at the National Bureau of Standards in determining the casting shrinkage of gold alloys. The significant changes made by Hollenback and Skinner are the substitution of a very thin layer of investment, a shorter specimen, a specimen about ¼ inch in diameter and a water jacket around the sprue and very near to the cavity into which the molten gold flows.

Data

All available data indicate that the degree of accuracy attained by all three investigators is of the same order as they all report values in agreement to the nearest 0.01 per cent. Therefore, the differences between their data must be attributed to factors other than the accuracy of experimentation. Among these are the size and shape of the specimens upon which the casting shrinkage was measured, the composition of the alloys and the casting technic.

Effect of Size and Shape of Casting

It is definitely known that the size and shape of the casting affect the linear casting shrinkage. Sweeney's determinations, made at the National Bureau of Standards and referred to in footnote 7, showed a range of from about 1 per cent to slightly over 1.4 per cent, depending upon the amount of interlocking of the specimen in the investment. In

order to absorb the effect of wide variations caused by different shapes, the value was reported as 1.2 ± 0.2 per cent to cover the range for practical castings as made in the various shapes and sizes from dental alloys. The same effect and variation were found by Hollenback and Skinner, as shown by their data in Figure 5 and Table 4. These data are minimized in their discussion, but are nevertheless of tremendous practical significance. They tend to show that there is no such thing as a fixed linear casting shrinkage for gold or for any of its alloys.

Effect of Spruing

There is also evidence that the method of spruing the casting affects shrinkage, as it has been noted for some time that the diameter of cast test rods (about 5½ inches long and 0.075 inch in diameter) may vary, the sprue end being smaller than the end furthermost from the sprue.

Discussion of Conclusions

It is believed that the first conclusion, "The casting shrinkage of pure gold was determined as 1.67 ± 0.02 per cent," might be modified by adding, ". . . on a cylindrical casting approximately 1 inch long and ¼ inch in diameter which was cast into a water-jacketed mold at room temperature." Data in Table 4 show that in all probability the value 1.67 ± 0.02 per cent would be changed if a different shaped specimen were used.

Under the present state of the knowledge of the casting shrinkage of gold and its alloys, it would be almost impossible to name any one value for any one alloy, unless exact details of the size and shape of the test specimen and precise details of the casting technic and materials used in the determination were given. Therefore, the suggestion in the final sentence of the paper that manufacturers should publish values for the casting shrinkages of their alloys is not practicable unless the details of the casting technic, including size and shape of the casting, are specified.

For instance, if the manufacturer should use the cylindrical specimen 1 inch long and ¼ inch in diameter and employ the technic used by Hollenback and Skinner, he would get, for 22-carat dark alloy of the composition specified, a linear casting shrinkage of 1.5 per cent (see specimen 11, Table 4). If slightly modified shapes were used (see Fig. 5 and specimens 17 to 20 in Table 4), the manufacturer would obtain values from 1.29 to 1.46 per cent.

It would seem, therefore, that each alloy would have an infinite number of values, depending upon the size and shape of the casting alone. What value should be used? What thickness of investment and what degree of mold chilling should be selected as the most representative of a dental casting which may range from a simple class 5 restoration to a partial or full denture casting? The specimen that presented a fairly severe degree of interlocking in the investment would unquestionably be more representative of actual dental casting practice than a cylindrical specimen.

Practical Considerations

The application of laboratory findings to service conditions is difficult. When one considers the smallness of the dimensions of many dental castings, the liberal taper of their walls and the thickness of the thinnest zinc phosphate cement films (from 15 to 40 microns), then one begins to realize that plus or minus 0.1 per cent in the linear casting shrinkage of dental gold alloys is not as critical from a practical standpoint as it might appear to be in the laboratory data.

Drs. Hollenback and Skinner are to be complimented on their craftsmanship in building the apparatus shown in Figure 3 and for publishing data which show that casting shrinkage is a function of the composition of the alloy.—*George C. Paffenbarger, Senior Research Associate, American Dental Association, National Bureau of Standards, Washington 25.*

Dental Health in Tientsin, China. By Earl W. Udick, D.M.D. and Vally Albrecht, D.M.D., 1st Mar. Div. Rein., San Francisco.

Information regarding oral health in China is very scarce. It was decided, as part of our rehabilitation program, to make a survey of at least one school. To our knowledge, no similar examination has ever been made here and the tabulation of data obtained yielded some information which we thought might be of interest to American dentists.

The teeth of the Chinese, particularly those of inhabitants of North China, appear to be less susceptible to caries than is the case in America. The presence of fluorides in the

water over a considerable portion of the area which we studied no doubt played an important role in this difference. The incidence of decay and loss of the permanent first molars, however, is high. Periodontal lesions, ranging from gingivitis to more serious conditions, are common among children of school age. We believe this to be attributable largely to wartime diet deficiencies.

Mottled enamel was so much in evidence that it was decided to obtain information regarding the source. It had been assumed, heretofore, that the wells supplying the ex-British Concession were responsible, since an analysis made in 1938 revealed a high percentage of fluorides. If we could prove this to be true, we would be in a position to make recommendations for correction of the condition by means of dilution or abandonment of the wells. The total number of students examined was 522. There were 166 cases of mottling. Of this number, eighty-two represented inhabitants of the ex-British Concession and seventy-eight, inhabitants of other localities.

It was necessary to obtain accurate information from each pupil as to place of birth, period of residence there and elsewhere and the source of water supply, if we were to arrive at definite conclusions. This proved to be no small task. Each pupil was permitted to take his chart home so that parents could supply the necessary answers to our questions, after which the charts were translated into English.

Birthplaces of the children were distributed over a large part of the provinces of Hopei and Jehol, with water supply from lake, river or city system (Table 1). It should be stated that the mottling ranged from light to very heavy, the preponderance being in the latter group. It must also be mentioned that the major portion of the students exhibiting no mottling were born and reared, nevertheless, in the ex-British Concession, and that all had used the existing water supply. We believe that the accumulated data represent a fairly accurate cross section of the area. At least it is proved that the wells in question are not entirely responsible except by a very small margin. It can be assumed that the fluorine content of water is general and not localized as was first believed.

Table 1.—Birthplace and residence during critical period

Location	Number of Students	Percentages
Ex-British Concession	82	51.25
Ex-French Concession	23	14.30
Ex-German Concession	13	8.12
Chinese City	13	8.12
Japanese City	1	.11
Outside Tientsin	29	18.11

There were 548 carious teeth or 3.54 per cent of the total number of teeth examined. The incidence of caries of the permanent first molar was 59 per cent and the incidence of its loss was 82 per cent. Forty teeth had been extracted previously. There were forty-four cases of gum disease, or 7.1 per cent and it was necessary to extract eighty-eight teeth. Seventeen per cent of the children had diseased tonsils. The number of cases requiring prophylaxis was 264 or 48 per cent.

Summary and Conclusions

1. Fluorides occur in the water supply over a large area in Tientsin, China, and are not limited to that of the ex-British Concession.
2. The incidence of caries is low.
3. The incidence of caries of the permanent first molar is high.
4. The number of teeth lost is low.
5. The incidence of loss of the permanent first molar is high.
6. Cases requiring care of the gums are numerous.

BOOK REVIEWS

Health Protection. By Herbert D. Simpson. 77 pages. Chicago: National Physicians Committee for the Extension of Medical Service, 1946.

This publication is a thoroughgoing and objective analysis of the trends and problems in developing voluntary prepayment plans in various parts of the country under medical society sponsorship. Made by a recognized authority in the field, the study provides a rather detailed inventory of the history, scope, significance and modes of operation in the states of Massachusetts, New Jersey, Michigan, Washington, Oregon and California.

The problems of administration and policy are concisely summarized in Chapter 8. In discussing the administrative problem of state versus local control, the author suggests an effective compromise, with state control for the costs of the service (that is, insurance or financing features) and local control for the administration of the medical care. The writer advocates the service plan as superior to the indemnity plan, and indicates that the former is the only effective means of opposing the menace of government medicine. He also advocates a broad coverage both in membership and in services, even at a necessarily high premium rate, for the purpose of building up good will in the public.

The dearth of actuarial data needed to initiate a medical service plan is a problem well on the road toward solution. First of all, the experience of the plans now operating has proved to be surprisingly similar. Second, it has been found unnecessary to have in sickness insurance data the same degree of refinement characteristic of life insurance mortality tables.

In discussing the long range economic effects of extending prepayment plans, Mr. Simpson expresses doubt that there will be any subsequent lowering of physicians' fees. If reduction did occur, he believes that it would be compensated by the elimination of collection costs, by the guaranty of payment of fees and by greater stability in the demand for medical services.

The author reports that dental service is included in the service plans of the Klamath Medical Service Bureau, Klamath Falls, Ore., and the Oregon Physicians Service, Salem, Ore. It should be noted that of the total expenses for medical care only 0.6 per cent was disbursed for dental service under the Klamath operation and only 3 per cent under the Oregon Physicians Service. Although the author indicates that the amount of dental service provided is liberal, other reports reveal that only extraction of the teeth and treatment of acute gum conditions are included. This again reflects the extreme lack of interest shown by the medical profession in this aspect of health. Other studies indicate that industrial-, government- and consumer-sponsored prepayment organizations have shown more interest in providing dental benefits.

In the introductory chapter, the author speaks of the present revolution in the organization of medical practice. Later he indicates that voluntary prepayment is an evolutionary program. It might be better to think of experiments and developments in the voluntary prepayment field as evolutionary, while wholesale and radical changes such as those proposed under the Wagner-Murray-Dingell bills should be classified as revolutionary. In any event, this reviewer feels that it is past the time for dentistry to take steps on its own power along the evolutionary pathway. —*J. E. Bagdonas.*

Dentistry in the Industrial Health Program. By Ernest Goldhorn, D.D.S. Vol. 1, Thirty-Third National Safety Congress Transactions. 624 pages. Paper. Price $5.00. Chicago: National Safety Council, Inc., 1944.

In many of the more progressive industrial organizations dental service has become an important part of the industrial hygiene program. A good dental service in an industrial health program is something more than emergency treatment—a fact not too widely recognized, unfortunately. A good industrial dental service includes practical methods for the detection of oral sepsis and the prevention of industrial injuries and occupational diseases.

The author speaks with much authority and experience as dental director for the Pullman-Standard Car Manufacturing Company. In this book he outlines the broader concept of dental industrial hygiene which is designed primarily for "keeping the man on the job." —*Allen O. Gruebbel.*

CURRENT LITERATURE

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Titles marked with an asterisk (*) are reviewed below.

The Editor's Viewpoint.—193.

*The Microbic Flora of the Dental Plaque in Relation to the Beginning of Caries. E. S. Hemmens, J. R. Blayney, S. F. Bradel and R. W. Harrison, Chicago.—195.

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The Microbic Flora of the Dental Plaque in Relation to the Beginning of Caries.

E. S. Hemmens, J. R. Blayney, S. F. Bradel and R. W. Harrison.

The cultivable aerobic, anaerobic and aciduric microbic floras of 939 dental plaques from 87 tooth surfaces of 44 children were studied beginning with the newly erupted tooth and continuing through the period of early enamel decay until after carious lesions had become well established. Changes in the frequency of isolation in culture of several types of bacteria were observed. Leptotrichia and Actinomyces, alpha hemolytic streptococci, fusiform bacteria and several species of Neisseria were among those forms which decreased in incidence with the progress of the lesion. Lactobacilli were the only bacteria for which there was definite evidence of increased incidence in association with the development of carious lesions.

Preliminary Reports on the Effect on Dental Caries of the Use of Sodium Fluoride in a Prophylactic Cleaning Mixture and in a Mouthwash.

B. G. Bibby, H. A. Zander, M. McKelleget and B. Labunsky.

A study in which three dental prophylaxes using a 1 per cent sodium fluoride-pumice-hydrogen peroxide mixture were given to the teeth on one side of the mouths of 47 children showed an over-all reduction in new caries of approximately 43 per cent. A similar study, in which two fluoride prophylaxes were given to 95 children, reduced caries by approximately 25 per cent. It is not believed that the difference in the results is fundamentally the consequence of the number of treatments given. In both instances caries reduction in the upper teeth was much greater than in the lower teeth. The use, thrice weekly for 1 year, of an acid (pH 4) mouthwash containing 0.1 per cent sodium fluoride did not reduce caries activity in 31 dental students below that of 15 using a control fluoride-free mouthwash, or 39 using no mouthwash.

The Buffer Capacity of Saliva as a Measure of Dental Caries Activity.

S. Dreizen, A. W. Mann, J. K. Cline and T. D. Spies.

Fifty patients with varying amounts of dental caries were arbitrarily selected after a medical, dental and dietary history was taken for each, supplemented by laboratory studies

for caries activity. After the observations the patients were divided into three groups, the criteria being nutritional status and degree of caries activity. Group 1 contained sixteen nutritionally deficient but relatively caries-free patients; Group 2, twenty well-nourished patients with moderate caries activity; and Group 3, fourteen well-nourished patients with rampant caries.

Paraffin-stimulated saliva collected from each of the fifty patients was tested for dental caries activity by the chemical method of Fosdick, Hansen and Epple, the bacteriologic method of Hadley and a method developed by the authors which measured the buffer capacity of the saliva. The latter method consisted of taking the pH reading of a 5 cc. sample of saliva with a Beckman pH meter. From a buret calibrated to deliver 0.04 cc. per drop, 0.1 N lactic acid was then added a drop at a time and a pH reading was taken after the addition of each drop. The resultant findings were used to form a titration curve. The amount of lactic acid required to lower the pH of the saliva sample from pH 7.0 to pH 6.0 was regarded as the measure of the buffer capacity of the saliva.

A definite and readily discernible difference was found to exist between the buffer capacity of the saliva of a caries immune person and a caries susceptible subject. The results achieved with the buffer capacity method correlated well with the chemical and bacteriologic tests for caries activity on the same samples of saliva, as well as with the findings obtained with the mouth mirror, exploring tine and dental roentgenogram. The buffer capacity test also offered an explanation for the few instances of noncorrelation between the chemical and bacteriologic tests.

Malnourished patients, relatively free from dental caries, had the highest buffer capacity in the saliva, the lowest number of Lactobacilli acidophilus and the least active Fosdick determination. In contrast, the well-nourished patients with either moderate or rampant caries showed a progressive decrease in the buffer capacity of the saliva and corresponding progressive increases in the Lactobacillus counts and the Fosdick determination.

Studies of the Effect of Glycerite of Hydrogen Peroxide upon the Numbers of Oral Microorganisms. L. W. Slanetz and E. A. Brown.

Hydrogen peroxide (1.5 per cent) as derived from urea peroxide (4 per cent) in glycerol stabilized with 8-hydroxy-quinoline (0.1 per cent) was used for two minutes as a toothbrushing agent and as a mouth rinse for one minute. Samples of saliva were collected at intervals of 10 and 30 minutes and one and two hours later. The total number of bacteria in the expectorated saliva decreased from 26 to 93 per cent. The number of fusiform organisms decreased from 52 to 93 per cent.

When the same technic was followed twice daily in the morning and evening (4 minutes of treatment), samples taken at 11 a.m. showed the decrease to vary from 11 to 79 per cent. After the use of three lozenges of penicillin (1000 units) after each meal (thirty minutes of treatment) the decrease varied from 40 to 86 per cent. The use of either undiluted Listerine or sterile water had no effect upon the number of expectorated organisms.

The use of the solution diluted 1:2 as a mouth rinse alone, at hourly intervals from 10 a.m. to 1 p.m., reduced the number of bacteria more than 90 per cent during the treatment and for approximately two hours afterwards.

The number of expectorated organisms of the control studies using sterile water were not significantly changed. Direct examination by darkfield technic of material taken from teeth and gingival crevices appeared to be an effective supplementary method for studying the effect of antiseptic solutions upon spirochetal organisms.

Chemical Studies in Periodontal Disease. III. Putrefaction of Salivary Proteins. M. Berg, D. Y. Burrill and L. S. Fosdick.

Saliva was gathered from persons with normal periodontal conditions and from those suffering from periodontal disturbances. The rates of putrefaction of the salivas were measured and compared. Putrefaction was determined by measuring the rate of hydrolysis and the production of indole, sulfides and odors. Changes in pH, Ec, EH and rH were determined. It was found that the rate of hydrolysis and the production of indole, sulfides and odors were much greater in the saliva from persons suffering from periodontal disease than in saliva from normal persons. A statistical analysis of the results showed that differences in pH, Ec, EH and rH were not significant.

Eosinophilic Granuloma. E. K. Wellensiek.

A case is reported of a child, aged 4, with eosinophilic granuloma of Hand-Schüller-Christian's disease. In the early stages of the disease the case was diagnosed as malignant neoplasm. It was not until a year later that the lesions in the oral cavity were thought to be correlated with the general manifestations. With this in mind, further roentgenographic and histologic examinations were made. These new findings entirely eliminated the original diagnosis of malignant neoplasm, and proved conclusively that the patient had the rare disease, eosinophilic granuloma.

Human Saliva. XVI. Relationship of Total Calcium to Inorganic Phosphorus of Resting Saliva. Hermann Becks and W. W. Wainwright.

Calcium and phosphorus milligram per cent levels were found to be directly related in all age groups of 650 persons examined ($r = +0.402 \pm 0.033$). The average ratio of calcium to phosphorus was 0.36 mg. per cent (o = 0.12 mg. per cent) with an observed range from 0.12 to 1.22 mg. per cent. The calcium-phosphorus ratio was highest between the ages of 20 and 29 years and lowest in younger and older groups. The calcium-phosphorus milligram per cent product was lowest in the youngest age groups, while the milligram per hour product varied greatly and without relation to age.

Human Saliva. XVII. Relationship of Total Calcium and Inorganic Phosphorus to Rate of Flow of Resting Saliva. H. Becks and W. W. Wainwright.

The milligram per cent calcium content in 650 persons tended to be related inversely to the rate of flow, however, with a low correlation coefficient (N), $r = -0.156 \pm 0.038$. The lowest rates of flow were accompanied by the highest milligram per cent calcium values, while above 19 cc. per hour the calcium content remained level. The phosphorus content showed a slight inverse relationship to rate of flow ($r = -0.281 \pm 0.034$). The correlation coefficients of all relationships between milligram per hour values (calcium or phosphorus or their ratio or product) and cubic centimeters per hour were extremely high. For example: total calcium milligrams per hour and rate of flow, $r = + 0.913 \pm 0.006$; inorganic phosphorus milligrams per hour and rate of flow, $r = + 0.810 \pm 0.013$; calcium-phosphorus product milligrams per hour and rate of flow, $r = + 0.770 \pm 0.016$; calcium milligrams per hour and phosphorus milligrams per hour, $r = + 0.783 \pm 0.016$. These high correlations resulted because of the relatively slight relation between milligram per cent concentration and rate of flow and the fact that the amount per time unit (milligrams per hour) was greatly influenced by the amount of saliva produced (cubic centimeters per hour). The high correlation between calcium and phosphorus milligram per hour values was not the result of any high correlation between the minerals but rather the result of the manner of calculating the milligram per hour value. This was confirmed by an exceedingly low partial correlation coefficient of calcium milligrams per hour and phosphorus milligrams per hour, holding the rate of flow constant ($r_{12.3} = + 0.154 \pm 0.038$). The calcium-phosphorus ratio was related slightly to the rate of flow ($r = 0.237 \pm 0.037$). The calcium-phosphorus milligram per cent product reflected the relationships of these constituents to the rate of flow ($r = -0.223 \pm 0.037$).

Human Saliva. XVIII. Is There a Seasonal Influence on Rate of Flow and Calcium and Phosphorus Content of Resting Saliva? W. W. Wainwright and H. Becks.

Salivary analyses of 650 persons were accumulated over a period of three years, sorted according to the month of examination and studied for possible seasonal effects. The analyses did not disclose any seasonal variation of rate of flow or of calcium or phosphorus content of resting saliva.

Development of Sebaceous Glands from Intralobular Ducts of the Parotid Gland. P. H. Harty. Arch. Path. 41:651, June 1946.

In the normal lobules of a parotid gland showing a recurrence of a typical mixed tumor were found small sebaceous glands developing from epithelium of striated or intercalated ducts. This finding demonstrates the latent potency of the ductal epithelium, which might be presumed on theoretical grounds since (1) the parotid gland develops from the ectoderm on the deep aspect of the cheek and (2) it is known that during puberty sebaceous glands develop in this region.—*J. E. G.*

LIST OF DENTAL OFFICERS

SEPARATED FROM ARMY DENTAL CORPS

THE following list of dental officers separated from the Army Dental Corps does not include rank because such information is no longer furnished by the Surgeon General's Office. Publication will be given to other names as soon as possible.

California

Berkeley	Anderson, Dedrick
Berkeley	Dean, James M.
Beverly Hills	Frieden, Sidney
Compton	Pohl, Donald W.
Glendale	Hanson, Robert E.
Hawthorne	Fraser, Wallace H.
Inglewood	Fairbrother, Paul C.
Los Angeles	Briskin, Jerome W.
Los Angeles	Distefano, Russell R.
Los Angeles	Higgins, Thomas R.
Los Angeles	Urban, Lloyd B.
Los Angeles	Winstanley, James H.
Menlo Park	Forsythe, Max W.
Menlo Park	Wasserman, Albert
Monterey	Sparolini, Robert L.
Oakdale	Pecchenino, Jack W.
Oakland	Emmerson, Clinton C.
Oakland	Vick, Clarence C.
Orinda	St. Clair, Kenneth J.
Palo Alto	Hadeler, Frederick C.
San Francisco	Loran, William
San Francisco	Souza, Anthony P.
Sanitarium	Baldwin, Lloyd M.
San Jose	Chan, James R.
Santa Paula	Barthuli, Jack W.
Stockton	Prince, Frank R., Jr.
Temple City	Young, Corwin D.
Ukiah	Sikora, Paul J.
Whittier	Wiley, Bruce C.

Colorado

Colorado Springs	Brown, Paul E.

Connecticut

Hartford	Finkelstein, Norman F.
Meriden	Hyman, Harold
Middletown	Lescoe, Edmund A.
Norwalk	Santaniello, Nicholas J.
Stamford	McEvoy, George F.

Illinois

Chicago	Bezman, Jack B.
Chicago	Crane, Clayton J.
Chicago	Glass, Harry M.
Chicago	Handelsman, Harry B.
Chicago	Maas, LeRoy F.
Chicago	Madonia, Loretto J.
Chicago	Weclew, Victor T.
Joliet	Hoag, Orvis S.
Lawrenceville	Burnett, George W.
Mt. Pulaski	Wait, Edwin C.
Oak Park	Cutlan, Robert J.

Indiana

Cambridge City	Irvin, Charles N.
Gary	Geisel, John E.
Indianapolis	Garcia-Fortuno, Rafael J.
New Albany	Lee, J. Harry, Jr.
Seymour	Bogardus, George S.

Michigan

Lincoln Park	Barber, Lewin F.
Oxford	Travis, Burton C.
Pontiac	Conger, Virgil
South Haven	Olson, John V.

Minnesota

Coleraine	Davis, Thomas W.
Duluth	Jacobsen, Walter M.
Fosston	Vig, Robert G.
Gaylord	Bancks, Leo M.
Kenyon	Strandemo, Lester E.
Le Sueur	Loken, Elmer B.
Minneapolis	Anderson, Marlowe L.
Minneapolis	Burns, Hugh T.
Minneapolis	Little, James R.
Minneapolis	Lund, Loren J.
Minneapolis	Ryan, Patrick J.
New Ulm	Miller, Thaxter H.

Mississippi

Columbia	Bush, Luther R., Jr.
Inverness	Herring, Woodard M., Jr.
Pachuta	Cooper, John R.
Tupelo	Weaver, Pinckney S., Jr.

Missouri

Bonne Terre	Paul, Raymond F.
Jackson	Rehm, Jerome G.
Kansas City	Gans, Alexander J.
Kansas City	Hatfield, Grant B., Jr.
Memphis	Zumsteg, Jon M.
St. Louis	Berman, Benjamin
St. Louis	Boczek, Walter J.
St. Louis	Mannhard, Cornelius E.
St. Louis	Pechersky, Louis
St. Louis	Rosenbaum, Morris
St. Louis	Treichel, Carl A.

Nebraska

Alexandria	Cory, Max E.
Oakland	West, Charles W., Jr.
Sterling	Arnold, Von D.

New Jersey

Arlington	Bodenweiser, Walter A.

Elizabeth	Benjamin, Milton
Elizabeth	Kotler, Herbert
Elizabeth	Yuckman, Benjamin P.
Englewood	Pitman, Irving G.
Jersey City	Feinstein, Clifford
Jersey City	Karlsberg, Herbert R.
Jersey City	Kinstein, Moses
Jersey City	Lane, Jay P.
Lyndhurst	Candio, Francis R.
Montclair	Stuart, Ralph C.
Newark	Nussbaum, Milton S.
New Milford	Marchand, Gerard W.
Nutley	Napoli, John G.
Paterson	Cohn, Sidney S.
Paterson	Levin, Jacob
Paterson	Nussman, John J.
Red Bank	Marshall, George E.
Somerville	Einhorn, George J.
Spring Lake	Brown, Joseph R.
Trenton	Lavine, Samuel H.
Union City	Pisano, Peter P.
Weehawken	Massarsky, Ashur
West Orange	Robin, Milton

New York

Binghamton	Smith, Kenneth
Bronx	Mariano, Francis A.
Brooklyn	Blatt, Jesse
Brooklyn	Brodsky, Jacob A.
Brooklyn	Cohen, Max
Brooklyn	Goldberger, Mortimer J.
Brooklyn	Gordon, Morris
Brooklyn	Lefferts, Nathan A.
Brooklyn	Rosenberg, Joseph A.
Brooklyn	Rutkin, Irving R.
Brooklyn	Smirnow, Martin
Brooklyn	Stein, Albert
Brooklyn	Stone, Sidney H.
Flushing	Rahn, Frank E.
Glendale	Weiss, Howard G.
Hamburg	Abbott, Richard S.
Inwood	Smith, Alton G.
Liberty Sullivan	Hahn, Samuel
Newark	Maressa, Bruno J.
New York	Anfang, Samuel
New York	Bell, Harold M.
New York	Carlin, Alvin H.
New York	Lieberman, Sol
New York	Marmelstein, Leo
New York	Rosenblum, Jack
New York	Schneider, Raymond
New York	Sherr, Max
New York	Sklar, Nathaniel
New York	Sussman, Bernard A.
Pelham	Kopely, Jack R.
Poughkeepsie	Lehman, Morton B.
Utica	Karwacki, Thaddeus J.
Waverly	Bucholtz, Harry
Yonkers	Propper, Leonard

North Carolina

Asheville	McCracken. Clayton H.
Enka	Steinman, Ralph R.
Fletcher	Harris. Royal L.
Forest City	McCall, Robert S.
Forest City	Morris, Donald W.
Franklin	Grant, Ben P., Jr.
Kipling	Smith, Robert L.
Lumberton	Cameron, James F.
Sylva	McGuire, Harold S.

LIST OF DENTAL OFFICERS

SEPARATED FROM NAVY DENTAL CORPS

THE following naval dental officers have been separated from service, according to lists received from the Navy Department. These lists are not complete. Other names will be published as soon as possible.

Alabama

Mobile	Dacovich, George S.	Lieut.
Mobile	McMurphy, John E.	Lieut.

Arizona

Phoenix	Zeitlin, Hyman	Lt. Cmdr.

California

Long Beach	Reimer, Carl J.	Lieut.
Los Angeles	Breitman, Seymour L.	Lieut.
Martinez	Howe, Frederick W.	Lieut.
Oakland	O'Grady, Henry W.	Capt.
Oakland	Smith, Bernard A.	Lieut.
San Diego	Mercer, Robert D.	Lt. Cmdr.
San Fernando	Karlsgodt, Erling K.	Lieut.
San Francisco	Bacigalupi, Robert J.	Lieut.
San Francisco	Hechter, Mitchell	Lt. Cmdr.
San Francisco	Kauffman, R. R.	Lieut.
San Francisco	Rudee, Donald A.	Lieut.
San Mateo	Benoit, Arthur E.	Lieut.
Santa Rosa	Mahan, Lee D.	Lt. Cmdr.

Colorado

Alamosa	Moore, Roy A.	Lieut.
La Jara	Bresee, Donald B.	Lieut.

Connecticut

East Norwalk	Daven, Albert J.	Lieut.
Hartford	Norwitz, Sidney S.	Lieut.
Southington	Cockayne, John E.	Lieut.
Wethersfield	Sehl, Philip T.	Lieut.

District of Columbia		
Washington	Wolf, Louis	Lt. Cmdr.
Florida		
Key West	Mulberg, V. C.	Lt. Cmdr.
Wakulla	Robison, W. F., Jr.	Lieut.
Georgia		
Mount Berry	Green, Randolph B.	Lieut.
Trion	Powell, Robert C.	Lieut.
Vienna	Waters, John L.	Lieut.
Illinois		
Chicago	Brzezinski, I. F.	Lieut.
Chicago	Conglis, Peter C.	Lieut.
Chicago	Hokin, Irving A.	Lieut.
Chicago	Kos, Frank J.	Lieut.
Chicago	O'Connell, John J.	Lieut.
Chicago	Rogalski, Philip E.	Lieut.
Chicago	Smithwick, Robert C.	Lieut.
Chicago	Waldman, Albert G.	Lieut.
Chicago	Williams, Anthony J.	Lieut.
Evanston	Peterson, Robert P.	Lieut.
Rock Island	Hainline, Richard P.	Lieut.
Rock Island	Sherrard, B. G.	Lieut.
Indiana		
Jeffersonville	McCormick, P. B.	Lt. Cmdr.
Iowa		
Sioux City	Reinking, Richard E.	Lieut.
Kansas		
Hill City	Wallace, Donald G.	Lieut.
Louisiana		
Lockport	Gouaux, Frank T., Jr.	Lieut.
New Orleans	Segreto, Angelo J.	Lieut.
Sulphur	Robinson, Henry H.	Lieut.
Maryland		
Baltimore	Hollander, Morton H.	Lieut.
Massachusetts		
Atlantic	Phipps, Wilbur N.	Cmdr.
Cambridge	Myles, Richard J.	Lieut.
North Quincy	Shalit, Bernard L.	Lieut.
Plymouth	Cohen, Wilfred E.	Lieut.
Salem	McCloskey, Donald F.	Cmdr.
South Boston	Foley, Joseph W.	Lieut.
Taunton	Murray, Lynwood C.	Lieut.
Watertown	Bird, Willard J.	Lieut.
Michigan		
Big Rapids	Dumon, John E.	Lieut.
Detroit	Varley, John P.	Lieut.
Detroit	Weinberg, Alex L.	Lieut.
Ferndale	Schofield, J. G., Jr.	Lieut.
Saginaw	Johnson, R. E.	Lt. Cmdr.
Minnesota		
Minneapolis	Hageman, B.	Lt. Cmdr.
Mississippi		
Bay Springs	Massey, Thomas O.	Lieut.
Gulfport	Peat, Walter H.	Lt. Cmdr.
Missouri		
Kansas City	Brubaker, Gordon L.	Lieut.
Montana		
Chester	Gau, George M.	Lieut.
New Jersey		
Collingswood	Sutton, Glenn A.	Lieut.
Haddon Heights	Hickland, Arthur W.	Lieut.
Merchantville	Smyth, Robert H. C.	Lieut.
Passaic	Sheft, Casimir R.	Lieut.
Paterson	Kurtz, George M.	Lt. Cmdr.
Trenton	Bulitt, Harold R.	Lieut.
New York		
Brooklyn	Berkowitz, Sidney M.	Lieut.
Brooklyn	Jackson, Edward J.	Lieut.
Brooklyn	Lambert, E. T., Jr.	Lieut.
Brooklyn	Steier, Fredrick	Lieut.
Buffalo	Valente, Richard A.	Lieut.
Gardenville	Huth, Chester H.	Lieut.
Ithaca	Brown, John A.	Lieut.
Lyons	Santelli, Arthur N.	Lieut.
New York	Carmen, Marvin	Lieut.
New York	DiSalvo, Nicholas A.	Lieut.
New York	Toback, Martin J.	Lieut.
Syracuse	DelBalzo, M.E.	Lieut.
North Carolina		
Aberdeen	Burns, Williams T.	Lieut.
Forest City	Hawkins, Jesse F.	Lieut.
Jacksonville	Szekely, Richard A.	Lieut.
Lawndale	Edwards, Byard F.	Lieut.
Southern Pines	Osborne, Colin. P., Jr.	Lieut.
Ohio		
Cincinnati	Limke, Louis H.	Lieut.
Cleveland	Antoszewski, E. J.	Lieut.
Cleveland	Konas, Clayton R.	Lieut.
Lakewood	Senger, Merlin W.	Lieut.
Winchester	Dunkin, Reason T.	Lieut.
Oklahoma		
Wewoka	Greene, Jack L.	Lieut.
Pennsylvania		
Leechburg	Bonello, Joseph J.	Lieut.
New Cumberland	Niebel, Harold H.	Lieut.
Overbrook Hills	Lawson, Francis H.	Lieut.
Philadelphia	Kennedy, Richard W.	Lieut.
Philadelphia	McTamney, Joseph P.	Lieut.
Philadelphia	O'Leary, John J.	Lieut.
Portage	Hochrein, C. M.	Lieut.
York	Adams, Thomas J.	Lieut.
Rhode Island		
Westerly	Dove, Ronald C.	Lt. Cmdr.
Tennessee		
Knoxville	Acker, Robert E.	Lieut.
Texas		
Ennis	Boren, William D.	Lieut.
Houston	Grammier, Fred	Lieut.
Houston	Settlemyre, H. V.	Lieut.
Virginia		
Petersburg	Sheintoch, Martin	Lieut.
West Virginia		
Charleston	Gale, Allan D.	Lieut.
Wheeling	Ashdown, Robert J.	Lieut.

DEATHS

Aijala, Eero A., Worcester, Mass.; died November 8; aged 36.

Alban, D. Emmett, Columbus, Ohio; College of Dentistry, Ohio State University, 1919; died November 7; aged 51.

Bake, Louis E., Chicago; College of Dentistry, University of Illinois, 1902; died November 8; aged 75.

Baumann, Joseph W., Roselle, N. J.; died November 22; aged 58.

Beyer, Louis A., Chicago; American College of Dental Surgery, 1894; died November 21; aged 76.

Blass, Edwin J., Portage, Wis.; Dental School, Northwestern University, 1905; died November 6; aged 66.

Carter, Fred W., Hammond, Ill.; School of Dentistry, Indiana University, 1921; died November 26; aged 52.

Clark, William P., Brooklyn, N. Y.; Pennsylvania College of Dental Surgery, 1887; died September 5.

Denault, Eugene V., Miami, Fla.; died November 15; aged 61.

Edlicka, Harold C., Midwest City, Okla.; died October 20; aged 49.

Ellison, Enoch L., Beckley, W. Va.; died November 15; aged 71.

Fallon, Martin J., Pittsfield, Mass.; School of Dentistry, Temple University, 1900; died November 8; aged 75.

Fichthorn, Robert F., Erie, Pa.; School of Dentistry, University of Pittsburgh, 1923; died September 23; aged 47.

Flatley, William T., Kenosha, Wis.; School of Dentistry, Marquette University, 1912; died October 25; aged 56.

Floore, Ernest L., Jeffersontown, Ky.; died September 26.

Folz, John F., Philadelphia; Pennsylvania College of Dental Surgery, 1907; died October 5; aged 59.

Fowle, Homer F., Milwaukee; died October 21.

Freund, Fredrick G., Detroit Lakes, Minn.; died October 28; aged 84.

Gallemore, John H., Fayette, Mo.; died September 29; aged 70.

Ganshert, J. W., Monroe, Wis.; School of Dentistry, Marquette University, 1911; died October 27; aged 56.

Gish, Earl H., Hershey, Pa.; died October 22; aged 50.

Glanville, Raymond T., Morristown, N. J.; died October 7; aged 51.

Graham, Gilbert F., Oakland, Calif.; College of Dentistry, University of California, 1895; died October 5.

Hamilton, DeForest W., Grand Rapids, Mich.; died September 26; aged 69.

Harrier, Amos B., Tyrone, Pa.; Medico-Chirurgical College of Philadelphia, 1911; died October 23; aged 60.

Harrison, Jeremiah G., Delafield, Wis.; School of Dentistry, Marquette University, 1901; died October 26; aged 73.

Helden, Albert L., Memphis, Tenn.; died October 15; aged 62.

Hilborn, Seth B., Portland, Maine; The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1905; died October 19; aged 74.

Hill, Wayne O., Indianapolis; School of Dentistry, Indiana University, 1917; died October 5; aged 53.

Hoek, Elmore J., Grand Haven, Mich.; College of Dental Surgery, University of Michigan, 1917; died October 12; aged 51.

Howard, A. C., Uniontown, Pa.; School of Dentistry, University of Pittsburgh, 1901; died October 21; aged 70.

Howery, Benjamin F., Riverside, Ill.; Dental School, Northwestern University, 1915; died November 2; aged 58.

Jedlicka, Harold C., Oklahoma City, Okla.; Kansas City-Western Dental College, 1918; died October 20; aged 48.

Jewett, William A., Gardner, Mass.; died October 23; aged 90.

Johnston, William T., Williamsport, Pa.; The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1899; died October 29.

Kenney, James T., Kansas City, Mo.; Kansas City Dental College, 1891; died October 15; aged 81.

Kieweg, Walter W., Kewaunee, Wis.; Chicago College of Dental Surgery, Dental Department of Loyola University, 1904; died October 12; aged 64.

Knef, Joseph P., Newark, N. J.; died October 8; aged 76.

Kramer, William F., St. Marys, Kan.; Dental School, Creighton University, 1916; died August 29; aged 57.

Kreutzer, Walter A., St. Louis, Mo.; School of Dentistry, Washington University, 1912; died October 14; aged 62.

La Shelle, Paul R., Pasadena, Calif.; died October 10; aged 42.

Lewis, A. M., Austin, Minn.; Pennsylvania College of Dental Surgery, 1891; died November 5; aged 79.

ANNOUNCEMENTS

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	April 8–10	Birmingham	G. W. Matthews	1922 Tenth Ave., S. Birmingham 5
Arizona			B. K. Litt	68 E. Congress, Tucson
Arkansas	May 19–21	Little Rock	I. M. Sternberg	Merchants Bank Bldg., Ft. Smith
California	April 28–30	San Francisco	L. E. Linehan	450 Sutter St., San Francisco
S. California			R. L. Borland	Rm. 615, 1052 W. Sixth St. Los Angeles 14
Colorado	May 25–28	Colorado Springs	R. A. Downs	724 Republic Bldg., Denver
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			J. Krygier	309 S. State St., Dover
D. of Columbia			K. H. Wood	1835 Eye St., N.W., Washington
Florida			A. J. Fillastre	601 Marble Arcade Bldg., Lakeland
Georgia			J. M. Heard, Jr.	Persons Bldg., Macon
Hawaii	Oct.	Honolulu	J. H. Dawe	P. O. Box 39, Honolulu 10
Idaho	June 9–11	Sun Valley	H. F. Miller	Moscow
Illinois	Oct. 9–11	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana	May 19–21	Indianapolis	E. E. Ewbank	Kingman
Iowa	May 6–8	Des Moines	A. N. Humiston	417 Higley Bldg., Cedar Rapids
Kansas	May 12–15	Kansas City, Mo.	F. A. Richmond	1008 Huron Bldg., Kansas City
Kentucky	March 31–April 2	Louisville	J. L. Walker	640 Barbee Way, S., Louisville
Louisiana	April 10–12	New Orleans	J. S. Bernhard	407 Medical Arts Bldg., Shreveport
Maine			A. H. Garcelon	State House, Augusta
Maryland	April 28–30	Baltimore	J. H. Shackelford	706 Baltimore Life Bldg., Baltimore 1
Massachusetts	May 5–8	Boston	P. E. Adams	106 Marlborough St., Boston
Michigan	April 14–16	Detroit	F. Wertheimer	Michigan Department of Health, Lansing
Minnesota	Feb. 24–26	Minneapolis	L. M. Cruttenden	Lowry Medical Arts Bldg., St. Paul
Mississippi	June 1–4	Biloxi	O. L. Colee	Magnolia
Missouri	May 12–15	Kansas City	C. W. Digges	Exchange National Bank Bldg., Columbia
Montana	May 1–3	Missoula	C. S. Renouard	305 Phoenix Bldg., Butte
Nebraska	May 12–14	Lincoln	F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	May 12-13	Las Vegas	L. G. Jacob	505 Chestnut St., Reno
New Hampshire	June 15–17	Portsmouth	F. E. Williams	814 Elm St., Manchester
New Jersey	April 27–30	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 26–28	Santa Fe	J. S. Eilar	First National Bank Bldg., Albuquerque
New York	May 13–16	Buffalo	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	May 4–7	Pinehurst	C. W. Sanders	Benson
North Dakota			K. G. Allen	Fargo
Ohio			E. G. Jones	185 E. State St., Columbus
Oklahoma	April 13–16	Oklahoma City	E. W. Wise	Medical Arts Bldg., Tulsa
Oregon	June 5–7	Portland	W. H. Hurley	Selling Bldg., Portland
Panama Canal Z.			T. W. Cagle	Box 243, Cocoli
Pennsylvania	May 6–8	Philadelphia	E. R. Aston	421 Market St., Kingston
Philippine I.			G. A. Carreon	9 Broadway, Third St., N. Manila
Puerto Rico			R. Miranda	Box 747, Rio Piedras
Rhode Island			M. B. Messore	707 Union Trust Bldg., Providence
South Carolina	April 27–29	Myrtle Beach	J. R. Owings	Greenville
South Dakota	May 29–31	Custer	E. W. Elmen	Sioux Falls
Tennessee	May 12–15	Nashville	E. J. Justis	Exchange Bldg., Memphis
Texas	April 28–May 1	San Antonio	W. Ogle	313 Medical Arts Bldg., Dallas
Utah			S. Ballinger	401 Medical Arts Bldg., Salt Lake City
Vermont	May 25–27	Woodstock	J. A. Larrow	Middlebury
Virginia	April 14–16	Roanoke	J. E. John	804 Medical Arts Bldg., Roanoke
Washington	May 5–7	Spokane	F. J. Dingler	1502 Medical & Dental Bldg., Seattle 1
West Virginia	May 19–21	Bluefield	C. J. Gavelda	Clarksburg
Wisconsin	March 31–April 2	Milwaukee	K. F. Crane	1233 Bankers Bldg., Milwaukee 2
Wyoming			J. D. McNiff	Laramie

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
California	Feb. 10–14	San Francisco	K. I. Nesbitt	515 Van Ness Ave., San Francisco 2
Florida	June 30–July 3	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Iowa	March 17–22	Iowa City	H. G. Bolks	923 Badgerow Bldg., Sioux City
Maine	March 1–2	Augusta	R. A. Derbyshire	Box 387, Skowhegan
Massachusetts	Feb. 10–12	Boston	J. C. Wilson	413N State House, Boston 33
Michigan	Feb. 3	Ann Arbor	H. T. Wood	502 David Whitney Bldg., Detroit 26
Mississippi	June 3–5		W. R. Madden	Forest
Nebraska	Feb. 4–7	Lincoln	C. A. Bumstead	924 Stuart Bldg., Lincoln
Pennsylvania	Feb. 17–22*	Philadelphia	R. E. V. Miller	61 N. Third St., Easton
Ohio	March 10–13	Columbus	E. D. Lowry	79 E. State St., Columbus
Oregon	March 3–6	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
South Carolina	July 7	Columbia	E. G. Bumgardner	1517 Hampton St., Columbia 29
West Virginia	June 23–26	West Liberty	R. H. Davis	510 Goff Bldg., Clarksburg
Wisconsin	Feb. 10–14	Milwaukee	S. F. Donovan	Tomah

*Feb. 17–19, written (dental); Feb. 18–19, written (hygienists).
Feb. 20–22, clinical (dental); Feb. 20, clinical (hygienists).

OTHER MEETINGS

Name	Date	City	Secy. or Chm.	Address
American Academy of Oral Pathology	Feb. 9	Chicago	Lt. Col. J. L. Bernier Secy.	Army Medical Museum, Washington 25
American Association of Orthodontists, Central Section	April 14–15	Minneapolis	C. R. Baker Chm.	636 Church St., Evanston, Ill.
American Association of Public Health Dentists	Feb. 9	Chicago	C. L. Sebelius Secy.	Tennessee Department of Public Health, Nashville
American Dental Association	Aug. 4–8	Boston	H. Hillenbrand Secy.	222 E. Superior St., Chicago
American Dental Hygienists' Association	Aug. 4–8	Boston	A. R. Fisk Secy.	1704 N. Troy St., Arlington, Va.
American Dental Society of Europe	Aug. 1948	London	K. C. Campbell Secy.	88 Portland Place, London, W.1.
American Society for the Advancement of General Anesthesia in Dentistry	March 24	New York	M. H. Feldman Ex. Secy.	730 Fifth Ave., New York
National Council on Rehabilitation	April 29–30	St. Louis	C. S. Truax Exec. Director	1790 Broadway, New York 19
District of Columbia Postgraduate Clinic	March 10–13	Washington	V. V. Skinner Publicity Chm.	1418 Good Hope Road, S.E., Washington 20
Thomas P. Hinman Mid-Winter Clinic	March 23–25	Atlanta	S. A. Garrett	Medical Arts Bldg., Atlanta
Alpha Omega Dental Fraternity, Illinois Alumni	Feb. 9	Chicago	H. Epstein President	4010 Madison St., Chicago
Chicago Club of Women Dentists, Twenty-Fifth Anniversary	Feb. 11	Chicago	Dora Hendrickson Secy.	55 E. Washington St., Chicago 2
Chicago Dental Society	Feb. 10–13	Chicago	L. R. Hegland Ex. Secy.	30 N. Michigan Ave., Chicago 3
Academy of Denture Prosthetics	July 28–Aug. 3	Boston	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
Washington University, Dental Alumni, Eighty-First Annual Meeting	Feb. 21–22	St. Louis	V. P. Thompson Secy.	111 W. Lockwood Ave., Webster Groves, Mo.
Northeastern Society of Orthodontists	March 10–11	New York	O. Jacobson Secy.	35 W. 81st St., New York
Greater Philadelphia Annual Meeting, Philadelphia County Dental Society	Feb. 5–7	Philadelphia	E. H. Smith Chm.	Stock Exchange Bldg., Philadelphia
Southwestern Society of Orthodontists, Twenty-Sixth Annual Meeting	Feb. 2–5	Dallas	J. O. Bailey Secy.	Hamilton Bldg., Wichita Falls

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The Children's Memorial Hospital, Chicago. Administrator, Mabel W. Binner, 707 Fullerton Ave., Chicago.

Columbia University, School of Dental and Oral Surgery. Associate Dean, Bion R. East, 630 W. 168th St., New York 32.

Eastman Dental Dispensary, Rochester, N. Y.

Fellowships for Research and Graduate Work in the Dental Sciences, University of Rochester. Dean, George H. Whipple.

The Forsyth Dental Infirmary for Children. Director, Percy R. Howe, 140 The Fenway, Boston.

International Grenfell Association. Staff Selection Committee, 156 Fifth Ave., New York.

Jewish Sanitarium and Hospital for Chronic Diseases. Director, Leonard Kohn, Dental Division, E. Forty-Ninth St. and Rutland Road, Brooklyn 3, N. Y.

Joseph Samuels Dental Clinic of the Rhode Island Hospital, Providence. Director, Ernest A. Charbonnel.

Notre Dame Bay Memorial Hospital, Twillingate, Newfoundland. Address John M. Konopka, 25 W. Independence St., Shamokin, Pa.

Richmond Freeman Memorial Clinic for Infants and Children, Dallas, Texas. Executive Director, Dora B. Foster, 3617 Maple Ave., Dallas.

University of Illinois, Graduate School. Secretary, Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 W. Polk St., Chicago 12.

University of Illinois, College of Dentistry. Isaac Schour, College of Dentistry, University of Illinois, 808 S. Wood St., Chicago 12.

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